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STANDARD SPECIFICATIONS AND PLANS



CITY OF STOCKTON

DEPARTMENT OF PUBLIC WORKS



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CITY OF STOCKTON

STANDARD SPECIFICATIONS

The following Standard Specifications and Standard Drawings have been adopted by the City of Stockton as a guide for standardization of public works installations within the City.

THEY ARE NOT INTENDED TO BE A SUBSTITUTE FOR PROFESSIONAL ENGINEERING KNOWLEDGE, EXPERIENCE, OR JUDGMENT.

Any deviations from what is contained herein must be approved by the City Engineer.

This book also contains Countywide Standards that have been accepted by the City Council upon the recommendation of the City Engineer.

CITY OF STOCKTON

DEPARTMENT OF PUBLIC WORKS

IMPORTANT
REVISIONS ARE AVAILABLE IN THE CITY OF STOCKTON WEBSITE
AT WWW.STOCKTONGOV.COM

Adopted 11/25/2003

Revised 11/25/2003

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS
STANDARD SPECIFICATIONS

NOTICE

The following sections together with the Latest Edition of the State of California, Business and Transportation Agency, Department of Transportation (Caltrans), Standard Specifications, as modified except the metric units and/or supplemented herein shall be the Standard Specification for public works construction in the City of Stockton.

To the extent the Department of Transportation Standard Specifications implement the STATE CONTRACT ACT, (or certain provisions of the Public Contracts code which are inapplicable to charter cities) they shall not be applicable.

A copy of the Latest Edition of the State of California, Business and Transportation Agency, Department of Transportation, Standard Specifications is on file in the Office of the Director of Public Works of the City of Stockton. Copies may be obtained from the State of California, Department of Transportation, Publication Distribution Unit, 1900 Royal Oaks Drive, Sacramento, California 95819, or by calling (916) 445-3520.

The Standard Detail Drawings attached are the Standard Plans of the City of Stockton and take precedence over the Caltrans Standard Specifications in case of any conflicts.

These Specifications and Plans may be modified in special cases on an individual project basis by special engineering analysis if approved by the City Engineer.

Amendments to the Specifications of the Department of Transportation may be issued by the State of California from time to time and will require adoption by the Director of Public Works to become a part of the City of Stockton Standard Specifications.

The Director of Public Works may also issue clarifications and amendments to these Standard Specifications and Standard Detail Plans as required.

Revised 11/25/2003

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Revised 11/25/03

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SECTION 1

DEFINITIONS AND TERMS

1-1.02A Abbreviations - (Organizational)

The following contains additions to Section 1-1.02A of the Caltrans Standard Specifications:

AAMA ..... Architectural Aluminum Manufacturer's Association
AAN ..... American Association of Nurserymen
AASHTO ..... American Association of State Highway and Transportation Officials
ACI ..... American Concrete Institute
AGA ..... American Gas Association
AIEE ..... American Institute of Electrical Engineers
AISC ..... American Institute of Steel Construction
AISI ..... American Iron and Steel Institute
AITC ..... American Institute of Timber Construction
AMA ..... Acoustical Materials Association
ANSI ..... American National Standards Institute
APA ..... American Plywood Association
API ..... American Petroleum Institute
AREA ..... American Railway Engineering Association
ASA ..... American Standards Association
ASCE ..... American Society of Civil Engineers
ASHRAE ..... American Society of Heating, Refrigerating and Air Conditioning Engineers
ASME ..... American Society of Mechanical Engineers
ASTM ..... American Society for Testing and Materials
AWG ..... American Wire Gage
AWPA ..... American Wood-Preservers' Association
AWS ..... American Welding Society
AWWA ..... American Water Works Association
Caltrans ..... State of California, Department of Transportation
CLFMI ..... Chain Link Fence Manufacturers Institute
CRA ..... California Redwood Association
COS ..... City of Stockton
CS ..... Commercial Standards
DEPA ..... Grade Trademark of American Plywood Association
EIA ..... Electronic Industries Association
ESO ..... Electrical Safety Orders
FHA ..... Federal Housing Administration
FS ..... Federal Specifications

GSA-FSS ..... General Services Administration-Federal Supply Services
IEEE ..... Institute of Electrical Electronics Engineers
IES ..... Illuminating Engineering Society
IPCEA ..... Insulated Power Cable Engineers Association
MFMA ..... Maple Flooring Manufacturer's Association
MLMFA ..... Metal Lathe Manufacturer's Association
NBFU ..... National Board Fire Underwriters
NBS ..... National Bureau of Standards
NEC ..... National Electrical Code
NEMA ..... National Electrical Manufacturers Association
NFPA ..... National Fire Protection Association
NPDES ..... National Pollution Discharge Elimination System
PCA ..... Portland Cement Association
PLIB ..... Pacific Lumber Inspection Bureau
PUC ..... Public Utilities Commission
RWQCB ..... Regional Water Quality Control Board
SCPI ..... Structural Clay Products Institute
SDI ..... Steel Deck Institute
SJI ..... Steel Joist Institute
SMACCNA ..... Sheet Metal and Air Conditioning Contractors National Association
SPR ..... Simplified Practice Recommendation
SWPPP ..... Storm Water Pollution Prevention Plan
SWRCB ..... California State Water Resource Control Board
TCA ..... Tile Council of America
UBC ..... Uniform Building code - International Conference of Building Officials
UL ..... Underwriters's Laboratories, Inc.
USCE ..... United States Corps of Engineers
USC&GS ..... United States Coast and Geodetic Survey
USGS ..... United States Geological Survey
WCLIB ..... West Coast Lumber Inspection Bureau
WIC ..... Woodwork Institute of California
WWPA ..... Western Wood Products Association

Reference in the Standard Specifications or special provisions to any of the publications of the above listed associations, organizations or authorities as a specification included, shall be taken to mean the latest current edition at time of bidding unless specifically stated otherwise.

1-1.02B Abbreviations (Word)

#4.....1/2" Rebar
AB.....Aggregate base
ABS.....Acrylonitrile-butadiene-styrene
AC.....Alternating current
AC.....Asphalt concrete
ACP.....Asbestos cement pipe
AKA.....Also Known As
AMP.....Ampere
AS.....Aggregate sub-base
AV.....Average
Ave.....Avenue
BC.....Beginning of curve
Blvd.....Boulevard
BM.....Bench mark
BMP.....Best Management Practice
BTU.....British Thermal Unit
BVC.....Beginning of vertical curve
BWG.....Birmingham Wire Gage (iron and steel wire)
CB.....Catch basin
CC or C/C.....Center to center
CF.....Cubic feet
CFM.....Cubic feet per minute
CFS.....Cubic feet per second
CIP.....Cast in place
CIPCP.....Cast in place concrete pipe
CL or ℄.....Center line
cm.....Centimeter
CMP.....Corrugated metal pipe
Conc.....Concrete
Const.....Construct
Cu.....Cubic
CY.....Cubic yard
D.....Diameter of pipe inside height of semi-elliptical conduit, or D-load
d.....Penny
Deg......Degree or degrees
DF.....Douglas fir
Dia.....Diameter
Dwg.....Drawing
E.....East
Ea.....Each

EC ..... End of curve
El or Elev ..... Elevation
EP ..... Edge of pavement
Eq ..... Equation
ESCP ..... Extra strength concrete pipe
EVC ..... End of vertical curve
EW ..... Each Way
Ex or Exist ..... Existing
FC (or FOC) ..... Face of Curb
FH ..... Fire hydrant
FL or L ..... Flow line
fpm ..... Feet per minute
fps ..... Feet per second
ft ..... Foot or feet
g ..... Gram
Ga ..... Gauge
Gal ..... Gallon
Galv ..... Galvanized
General Permit ..... General Construction Activity Storm Water Permit
GL ..... Ground line
GPM ..... Gallons per minute
Gr ..... Grade
H ..... High or height
HP ..... Horsepower
HR ..... Hour
Hor ..... Horizontal
IN ..... Instrument Number
IP ..... Iron pipe
KVA ..... Kilo Volt Amps
KW ..... Kilowatts
L ..... Length
Lb ..... Pound
LF ..... Linear foot
LH ..... Lamp hole
LS ..... Lump sum
Lin ..... Linear
Long ..... Longitudinal
Lt ..... Left
M ..... Meter
Max ..... Maximum
MEP ..... Maximum Extent Practicable
MFBM ..... Thousand feet board measure

MGD.....Million gallons per day
MH.....Maintenance Hole
M Gal.....Thousand gallon
Mi.....Mile
Min.....Minimum
mm.....Millimeter
Mon.....Monument
N.....North
NE.....Northeast
NW.....Northwest
No.....Number
NOI.....Notice of Intent
OC.....On center
OG.....Original ground
OD.....Outside diameter
OR.....Official Records of County
Oz.....Ounce
PCC.....Point of compound curve or Portland Cement Concrete
PG&E.....Pacific Gas & Electric Co.
PI.....Point of intersection
P/L or ℄.....Property line
PP.....Power pole
pphm.....Parts per hundred million
ppm.....Parts per million
PRC.....Point of reverse curve
Prop.....Proposed
psf.....Pounds per square foot
psi.....Pounds per square inch
PT.....Point of tangency
PacBell.....Pacific Bell
PUE.....Public Utility Easement
PVC.....Polyvinyl chloride
Pvmt.....Pavement
Q.....Rate of flow or quantity
Qt.....Quart
R.....Radius
RP.....Reduced Pressure
RCP.....Reinforced concrete pipe
Rdwy.....Roadway
Ret Wall.....Retaining wall
Rt.....Right
R/W.....Right of way

S ..... South or slope
San ..... Sanitary
SC ..... Sewer Connection
SD ..... Storm drain (aka Storm Sewer)
Sec ..... Seconds
SF ..... Square foot
SE ..... Southeast
Spec ..... Specifications (aka Standard Specifications)
Sq ..... Square
Sq Ft ..... Square foot
Sq Yd ..... Square yard
SS ..... Sanitary sewer
St ..... Street
Sta ..... Station
Std ..... Standard
SY ..... Square Yard
SW ..... Southwest
SWPPP ..... Storm Water Pollution Prevention Plan
T ..... Tangent distance
T_a ..... Total Asphalt or Full Depth Asphalt
TBM ..... Temporary Bench Mark
V ..... Velocity of flow
VC ..... Vertical Curve
VCP ..... Vitrified clay pipe
Vert ..... Vertical
W ..... West or width
W/ ..... With
WPJ ..... Weakened Plane Joint
WWF ..... Welded Wire Fabric
Yd ..... Yard or Yards

1-1.02C Symbols

E ..... Degree (s)
/ ..... Per
% ..... Percent
' ..... Feet, Minutes
" ..... Inches, Seconds
x ..... By
@ ..... At

1-1.03 Definitions

The following are additional definitions or definitions included in Caltrans Standard Specifications, which have been added to or modified for City of Stockton uses.

Acceptance (Caltrans Section 1-1.03) - The formal written acceptance by the City of Stockton of an entire contract which has been completed in all respects in accordance with the Standard Specifications and Plans and any modifications thereof previously approved.

Arterial (Street Classification) - That part of the roadway system serving as the principal network for through traffic flow. The routes connect areas of principal traffic generation and important rural highways entering the city.

Classification questions should be directed to the Traffic Engineering Section of the Public Works Department of the City of Stockton.

Attorney General - This term is to be interpreted to mean the City Attorney for the City of Stockton.

Auxiliary Lane - That portion of the roadway adjoining the traveled way for speed change or other purposes supplementary to through traffic movement

California - Shall be interpreted to mean Stockton where it is used as a point of delivery.

California Storm Water Best Management Practice Handbooks;
Volume 1: Municipal BMP Handbook;
Volume 2: Commercial/Industrial BMP Handbook;
Volume 3: Construction BMP Handbook; - Refer to Chapter 13, Stockton Municipal Code

Caltrans - The State of California, Business & Transportation Agency, Department of Transportation.

City - The City of Stockton, California.

City Attorney - The City Attorney of the City of Stockton. Any reference to the Attorney General in Caltrans specifications shall mean the City Attorney of the City of Stockton.

City Council - The Stockton City Council.

Code - The terms Government Code, Labor Code, etc. refer to codes of the State of California.

Collector (Street Classification) - A collector street is defined as a street which serves traffic movements within subdivision and connects this area with an arterial street or other collector street.

Classification questions should be directed to the Traffic Engineering Section of the Public Works Department of the City of Stockton.

Commercial - Refer to Chapter 16 of the Stockton Municipal Code.

Contract Price - The total amount of money for which the contract is awarded.

Contract Unit Price - The contractor's original bid for a single unit of an item of work in the Proposal.

Days (Caltrans Section 1-1.12) - Unless otherwise designated, days as used in the Standard Specification will be understood to mean working days.

Deeplift Asphalt Concrete - (See Full Depth Asphalt Concrete)

Deep Strength Asphalt Concrete - (See Full Depth Asphalt Concrete)

Department (Caltrans Section 1-1.13) - The Department of Public Works of the City of Stockton. Any reference to the terms "Department" or "Department of Transportation" in Caltrans Standard Specifications shall mean the Department of Public Works of the City of Stockton when referring to the administration of the project.

Director of Public Works - The executive officer of the Department of Public Works as created by law or the executive officer's assigned representative. Any reference to the terms "Director" or "Director of Transportation" in Caltrans Standard Specifications shall mean the Director of Public Works of the City of Stockton. Any reference to the terms "Director" or "Director of Public Works" shall also mean the Director of Municipal Utilities or Director's assigned representative on projects or contracts for which the Municipal Utilities Department is the responsible department.

Electrolier - Street light assembly complete, including foundation, standard, luminaire arm, luminaire, etc.

Engineer (Caltrans Section 1-1.18) - The City Engineer of the City of Stockton acting either directly or through properly authorized agents, such agents acting within the scope of the particular duties delegated to them. Any reference to the terms "Engineer" or "City Engineer" shall also mean the Director of Municipal Utilities on projects or contracts for which the Municipal Utilities Department is the responsible department.

Engineer's Estimate - The list of estimated quantities of work to be performed as contained in the "Bid Proposal" under "Department of Public Works, City of Stockton Estimate."

Full Depth Asphalt Concrete - The term FULL-DEPTH (registered by The Asphalt Institute with the U.S. Patend Office) certifies that the pavement is one in which asphalt mixtures are employed for all courses above the subgrade or improved subgrade. A FULL-DEPTH asphalt pavement is laid directly on the prepared subgrade. (The mathematical symbol Ta denotes Full-Depth or Total Asphalt.) (May also be referred to as Deep Lift or Deep Strength Asphalt Concrete)

Highway (Caltrans Section 1-1.24) - The whole right-of-way or area which is reserved for and secured for use in constructing the roadway and its appurtenances. Where the work is not specifically highway or street work, the term "highway" or "highway right-of-way" shall be interpreted to mean the property line or the bounded area of the site of the improvement/work or be deleted, where applicable.

Holiday – An undesirable discontinuity or break in the anticorrosion protection on pipe or tubing.

Industrial - Refer to Chapter 16 of the Stockton Municipal Code.

Laboratory (Caltrans Section 1-1.25) - The established laboratory of the City of Stockton and/or the laboratory chosen by, or approved by the City of Stockton and authorized to test materials and work involved in the contract.

Liquidated Damages (Caltrans Section 1-1.26) - The amount prescribed in the special conditions to be paid to the City of Stockton or to be deducted from any payments due or to become due to the Contractor for each day's delay in completing the whole or any specified portion of the work beyond the time allowed in the Standard Specifications.

Local (Street Classification) - Roadways used primarily for direct access to residential, commercial, industrial or other abutting property. They do not include roadways carrying through traffic. A local street is defined as a facility having the sole function of providing access to immediately adjacent land.

Clarification questions should be directed to the Traffic Engineering section of the Public Works Department of the City of Stockton.

Lowest Responsible Bidder - The company or firm whose bid is arithmetically lowest and who meets the criteria set forth in Stockton Municipal Code Section 3-025.

Luminaire - The lamp housing including the optical and socket assemblies (and ballast if so specified).

Other Agencies - Whenever reference is made to any Federal, State or County agency or officer, such reference shall be deemed made to any agency or officer succeeding in accordance with law to the powers, duties, jurisdiction, and authority of the agency or officer mentioned.

Plans - (aka Standard Plans and/or Project Plans as applicable) Refer to the definitions under Standard Specifications and Plans later in this section.

Project Plans - The project plans are specific details and dimensions peculiar to the work and are supplemented by the Standard Plans insofar as the same may apply. The Standard Plans shall also be interpreted to mean those Standard Plans incorporated within the document.

Proposal Form (Caltrans Section 1-1.32) - The approved form upon which the City of Stockton requires formal bids be prepared and submitted for work. (See Section 2-1.05)

Proposal Guaranty (Caltrans Section 1-1.33) - The cash, cashier's check, certified check, or bidder's bond accompanying the proposal submitted by the bidder, as a guaranty that the bidder will enter into a contract with the City of Stockton for the performance of the work if the contract is awarded to the bidder.

Residential - Refer to Chapter 16 of the Stockton Municipal Code.

Right-of-Way - Any reference to the term "right-of-way" or "highway right-of-way" shall be interpreted to mean the property right-of-way, property line or the bounded area of the side of work, where applicable.

Sand - aka Class 4 aggregate subbase shall conform to the provisions of Sections 19 and 25 of Cal Trans standard specifications. Class 4 aggregate subbase material shall be clean and free from vegetable matter and other deleterious substances. The percentage composition by weight of Class 4 aggregate subbase material shall conform to the following grading when determined by test method No. California 202.

Sieve Sizes	Percentage Passing
2 1/2	100%
NO. 200	2 - 35%

Class 4 aggregate subbase material shall also conform to the quality requirements shown in the following table

Tests	Test Method No. Calif.	Requirements
Sand Equivalent	217	20 min.
Resistance	301	55 min.

Service Connection - Service connections are all or any portion of the conduit, cable or duct, including meter, between a utility distribution line and an individual consumer.

Sewer - Any conduit intended for the reception and transfer of sewage and fluid industrial waste.

Sewer (Private) - A sewer, wholly within private property and maintained privately.

Sewer Connection - A sewer, within a public street, a public utility easement right of way, proposed to connect any parcel, lot or part of a lot with a main line sewer.

Specifications - (aka Standard Specifications) The written directions, provisions, and requirements contained in the "Standard Specifications and Plans" as published by the City of Stockton and as supplemented by the Special Provisions.

Special Provisions (Caltrans Section 1-1.37) - The special provisions are specific clauses setting forth conditions or requirements peculiar to the work and supplementary to these Standard Specifications and Plans. The State of California, Department of Transportation publication entitled "Labor Surcharge and Equipment Rental Rates and General Prevailing Wage Rates" are to be considered as a part of the special provisions.

Standard Specifications and Plans (Caltrans Section 1-1.29) - The official Project Plans and Standard Plans, profiles, typical cross sections, general cross sections, working drawings and supplemental drawings, or reproductions thereof signed by the City Engineer, which show the location, character, dimensions and details of the work to be performed. All such documents are to be considered as part of the Standard Plans whether or not reproduced in the special provisions.

In the above definition, the following terms are defined as follows:

(a) Standard Plans - The Standard Detail Drawings of the Department of Public Works published as part of the Standard Specifications and Plans as may be adopted, or adopted and modified in the project plans.

(b) Project Plans - The project plans are specific details and dimensions peculiar to the work and are supplemented by the Standard Plans insofar as the same may apply. The Standard Plans shall also be interpreted to mean those Standard Plans incorporated within the document.

(c) Standard Specifications - The written directions, provisions, and requirements contained in the "Standard Specifications and Plans" as published by the City of Stockton and as supplemented by the Special Provisions.

(d) Special Provisions (Caltrans Section 1-1.37) - The special provisions are specific clauses setting forth conditions or requirements peculiar to the work and supplementary to these Standard Specifications and Plans. The State of California, Department of Transportation publication entitled "Labor Surcharge and Equipment Rental Rates and General Prevailing Wage Rates" are to be considered as a part of the special provisions.

State - The State of California. Any reference to the terms "State" or "State of California" in Caltrans Standard Specifications with reference to administration of the project, shall mean the City of Stockton, where applicable.

State Treasurer - Shall be interpreted to mean the City of Stockton Finance Department, where applicable.

Storm Drain - (aka Storm Sewer) Any conduit and appurtenances intended for the reception and transfer of storm water.

Storm Water Management Program - The City of Stockton's Storm Water Management Program as delineated in the City's NPDES Permit for Storm Water Discharges from Municipal separate storm sewer systems.

Street - Any road, highway, parkway, freeway, alley, walk, or way.

Subcontractor - The individual, partnership, corporation or other legal entity entering into a contract with the contractor to perform a portion of the work.

Surety - Any individual, firm or corporation, bound with and for the contractor for the acceptable performance, execution, and completion of the work, and for the satisfaction of all obligations incurred.

Traveled Way - That portion of the roadway for the movement of vehicles, exclusive of shoulders and auxiliary lanes.

Utility - Tracks, overhead or underground wires, pipe lines, conduits, ducts, or structures, sewers or storm drains owned, operated, or maintained in or across a public right of way or private easement.

Welding Specifications - The directions, provisions and requirements contained in these Standard Specifications as modified and as supplemented by the special provisions. Caltrans "Standard Specifications for Welding Structural Steel" dated January 1981 is to be considered a part of these Standard Specifications. Whenever the term "these specifications" is used in this book, it means the provisions set forth in the City of Stockton Standard Specifications and Plans and Caltrans "Standard Specifications for Welding Structural Steel."

SECTION 2

PROPOSAL REQUIREMENTS AND CONDITIONS

2-1.01 Contents of Proposal Forms - The following is to be added: Prospective bidders will be furnished with proposal forms which will state the location and description of the contemplated construction and if applicable show the approximate estimate of the various quantities and kinds of work to be performed or materials to be furnished, with a schedule of items for which bid prices are asked. All special provisions will be grouped together and attached to the proposal form.

2-1.02 Approximate Estimate - The following is to be added: The quantities given in the notice to contractors, and in the proposal and contract are approximate only, being given as a basis for the comparison of bids. The City does not expressly or by implication, agree that the actual amount of work will correspond therewith, and reserves the right to increase or decrease the amount of any class or portion of the work, or to omit portions of the work, as may be deemed necessary or advisable by the Engineer.

2-1.03 Examination of Plans, Specifications, Contract, and Site of Work - The following is to be added:

No oral interpretations or clarification of the Standard Plans and Specifications and special provisions will be made prior to the bid opening. Any such requests shall be made in writing and will be answered in writing. If errors are found, the bidder shall provide written notification as soon as possible prior to the bid opening in order that letters of clarification can be prepared and given to all bidders.

Where the City has made investigations of subsurface conditions in areas where work is to be performed under the contract, or in other areas, some of which may constitute possible local material sources, such investigations are made only for the purpose of study and design. Where such investigations have been made, bidders or Contractors may, upon written request, inspect the records of the City as to such investigations subject to and upon the conditions hereinafter set forth.

The records of such investigations are not a part of the contract and are shown solely for the convenience of the bidder or contractor. It is expressly understood and agreed that the City assumes no responsibility whatsoever in respect to the sufficiency or accuracy of the investigations thus made, the records thereof, or of the interpretations set forth therein or made by the City in its use thereof and there is no warranty or guaranty, either express or implied, that the conditions indicated by such investigations or records thereof are representative of those existing throughout such areas or any part thereof, or that developments, not specifically looked for, may not occur, or that materials other than, or in proportion different from those indicated, may not be encountered.

2-1.05 Proposal Forms - The City will furnish to each bidder a standard proposal form, which when filled out properly, executed, and submitted shall be the bidder's bid. Bids, not presented on forms so furnished shall be considered non-responsive. Proposal forms are furnished with the Special Provisions and Project Plans and shall be obtained at the Public Works office of the City of Stockton, City Hall.

The proposal form is bound in a book together with the notice to contractors, special provisions, and contract. Neither the proposal form nor any other portion of the said book shall be detached therefrom. The proposal shall set forth for each item of work, in clearly legible figures, an item price and a total for the item in the respective spaces provided, and shall be signed by the bidder, who shall fill out all blanks in the proposal as therein required.

All bids shall be clearly and distinctly written and if any erasure or interlineation occurs therein, before the bid is filed with the City Clerk, said erasure or interlineation shall be initialed by the person authorized to prepare and execute the bid.

The proposal shall be submitted as directed in the "Notice Inviting Bids" under sealed cover plainly marked as a proposal, and identifying the project to which the proposal relates and the date of the bid opening thereof. Proposals that are not properly marked may be rejected at the discretion of the City.

2-1.07 Proposal Guaranty - All bids shall be presented under sealed cover and accompanied by one of the following forms of bidder's security:

The following shall be changed or added:

Cash, a cashier's check, a certified check, or a bidder's bond executed by an admitted surety insurer, made payable to the City of Stockton (rather than the Director of Transportation).

The security shall be in an amount equal to 10 percent of the amount of bid. A bid will not be considered unless one of the above described forms of bidder's security is enclosed with it.

2-1.075 Affirmative Action – All contract proposals and work on City of Stockton contracts utilizing federal funds (excluding DOT-assisted) shall conform to the City's Equal Employment Program as set forth in City Council Resolution 97-0393. Bidders and Contractors shall submit forms and documentation as required per City of Stockton Affirmative Action Guidelines.

For Federal DOT-assisted projects, the City's Disadvantaged Business Enterprise (DBE) program as set forth in Council Resolution 01-225 will apply. Bidders and Contractors shall submit forms and documentation as required by the City's DBE program.

There are no Affirmative Action or DBE requirements for projects funded solely with local and/or State funds.

2-1.08 Withdrawal of Proposals - Any bid may be withdrawn at any time prior to the time fixed in the public notice for the opening of bids only by written request for withdrawal of the bid filed with the City Clerk. The request shall be executed by the bidder or the bidder's duly authorized representative. The withdrawal of a bid does not prejudice the right of the bidder to file a new bid. Whether or not bids are opened exactly at the time fixed in the public notice for the opening of bids, a bid will not be received after that time, nor may any bid be withdrawn after the time fixed in the notice for the opening of bids.

2-1.095 Relief of Bidders - The following is to be changed: If the bidder claims a mistake was made in the bidder's bid, the bidder shall give the City written notice within 3 days after the opening of the bids of the alleged mistake, specifying in the notice in detail how the mistake occurred.

2-1.10 Disqualification of Bidders - The following is to be added: Nothing in this section shall prohibit material suppliers or subcontractors from quoting prices to more than one bidder.

2-1.109 Competency of Bidders - Attention is directed to Section 7.1.01E, "Contractor's Licensing Laws," and the requirements of law referred to therein relating to the licensing of Contractors.

SECTION 3

AWARD AND EXECUTION OF CONTRACT

3-1.01 Award of Contract - The right is reserved to reject any and all proposals. The award of the contract, if it be awarded, will be to the lowest and best responsible bidder whose proposal complies with all the requirements prescribed. Such award, if made, will be made as stated in the special provisions. If the lowest and best responsible bidder refuses or fails to execute the contract, the City of Stockton may award the contract to the second lowest and best responsible bidder.

All bids will be compared on the basis of the Engineer's Estimate of the quantities of work to be done.

3-1.02 Contract Bonds - The Contractor will be required to furnish a surety bond for the faithful performance of the Contractor's contract and also a labor and material bond, each in the sum of one hundred percent (100%) of the contract price.

The Faithful Performance Bond will be retained by the City of Stockton for twelve (12) months following final acceptance by the City of the improvements to guarantee correction of failure attributable to workmanship and materials. Upon said final acceptance by the City, the amount of the Faithful Performance Bond may be reduced to twenty percent (20%) of the actual improvement construction costs.

The bonds required of the Contractor shall be furnished by a company authorized to do a surety business in the State of California: said bonds shall be executed by the Surety and Contractor before or concurrently with the signing of the contract. The form of said bonds shall be approved by the City Attorney and the surety of Sureties shall be approved by the Director of Finance.

All alterations, extensions of time, extra or additional work and other changes authorized by these Standard Specifications, or any part of the contract may be made without securing the consent of the Surety on the contract bonds.

3-1.03 Execution of the Contract - The contract shall be executed within ten (10) days not including Saturdays and Sundays and legal holidays, after the bidder has received the contract, via certified mail.

3-1.04 Failure to Execute Contract - Failure of the lowest and best, the second lowest and best, or the third lowest and best to execute the contract and file acceptable bonds as provided herein within 10 days not including Saturdays, Sundays and legal holidays, after the bidder has received the contract, via certified mail, shall be just cause for the forfeiture of the proposal guaranty. The successful bidder may file with the City Clerk a written notice,

signed by the bidder or the bidder's authorized representative, specifying that the bidder will refuse to execute the contract if presented to the bidder. The filing of such notice shall have the same force and effect as the failure of the bidder to execute the contract and furnish acceptable bonds within the time herein before prescribed.

3-1.05 Return of Proposal Guaranties - Within 10 days after award of the contract to the lowest responsible bidder, the City of Stockton will return the proposal guaranties accompanying the proposals no longer being considered.

The proposal guarantee of the lowest responsible bidder will be held until evidence of insurance, a current City of Stockton business license, and satisfactory bonds are provided and the contract is fully executed and filed with the City Clerk.

If the lowest responsible bidder fails or refuses to enter into the contract to do said work, furnish said supplies, or to furnish the required bonds within 10 business days after award of contract, the proposal guarantee shall be forfeited to the City of Stockton.

SECTION 4

SCOPE OF WORK

4-1.02 Site Maintenance and Final Cleaning Up - The following is to be added: The Contractor shall conduct and cause all working forces at the site to maintain the site in a neat orderly manner throughout the construction operations. The work shall be conducted in a manner that will control the dust. When ordered to provide dust control, the Contractor shall use water or turn soil to reduce the dusty conditions, all to the satisfaction of the Engineer and in accordance with Section 10 of the Standard Specifications. During construction, the Contractor shall remove all rubbish and debris as it is generated to the satisfaction of the Engineer.

Contractor's activities shall conform to the requirements of the Storm Water Management Program and/or BMPs delineated in the project SWPPP. All appropriate provisions of the General Permit including Post-Construction Storm Water Management shall be adhered to.

Nothing herein, however, shall require the Contractor to remove warning, regulatory, and guide signs prior to formal acceptance by the City.

Full compensation for all site maintenance and cleanup will be considered as included in the prices paid for the various contract items of work and no separate payment will be made therefor.

4-1.03 Changes - The following is to be added: For contracts approved by the City Council for initial prices of less than One Hundred Thousand Dollars ($100,000), individual and/or cumulative change orders of Twenty-three Thousand Five Hundred Seventy-eight Dollars ($23,578) or that amount approved by City Council Action or greater require City Council approval. For contracts approved by the City Council with initial prices of One Hundred Thousand Dollars ($100,000) or more, individual and/or cumulative changes orders which exceed Twenty-three Thousand Five Hundred Seventy-eight Dollars ($23,578) or that amount approved by city Council Action plus ten percent (10%) of the initial contract price over One Hundred Thousand Dollars ($100,000) require City Council approval. Change orders not meeting the above criteria require approval by the authorized CITY official executing this contract. The dollar amounts of change orders approved by specific City Council action, plus the dollar amounts of any change orders which predate such specific City Council action, shall not be counted in computing the authority limits set forth above for CITY officials to approve change orders hereunder.

When the compensation for an item of work is subject to adjustment under the provisions of this Section 4-1.03, the Contractor shall, upon request, promptly furnish the Engineer with adequate detailed cost data for said items of work.

In emergency situations, the authorized City official may issue a change order beyond the authority limits described above in order to:

(a) Prevent interruption of the work which would result in a substantial increase in the costs to, or liability of the City; or

(b) Protect the work, equipment, materials to be used in the work, human safety, or the environment at or near the work from substantial and immediate danger or injury; or

(c) Protect, where damage or injury has occurred, the work, equipment or materials to be used in the work, human safety, or the environment from further or additional damage or injury or deterioration.

(d) The authorized City official shall have the authority to issue change orders in such sums as is reasonably necessary for such emergency purposes. After issuing a change order in an emergency situation described above, the authorized City Official shall report such action and the reasons therefor to the City Council in writing not later than its next regularly scheduled meeting or as soon thereafter as is practicable.

(e) Upon receipt of an approved contract change order, the Contractor shall proceed with the ordered work. If ordered in writing by the Engineer, the Contractor shall proceed with the work so ordered prior to actual receipt of an approved contract change order therefor. In such cases, the Engineer will, as soon as practicable, issue an approved contract change order for such work and the provisions in Section 4-1.03A, "Procedure and Protest," shall be fully applicable to such subsequently issued contract change order.

4-1.03A Procedure and Protest - The paragraph is to be changed as follows: Proposed contract change orders may be presented to the Contractor for the Contractor's consideration prior to approval by the Engineer. If the Contractor signifies the Contractor's acceptance of the terms and conditions of such proposed contract change order by executing such documents and if such change order is approved by the City Manager or City Council and issued to the Contractor, payment in accordance with the provisions as to compensation therein set forth shall constitute full compensation for all work included therein or required thereby. A contract change order approved by the City Manager or City Council is an executed contract change order as that term is used in Section 4-103B to 4-1.03D, inclusive. An approved contract change order shall supersede a proposed contract change order covering the same work.

4.103B Increased or Decreased Quantities - This section of Caltrans Specifications is to be deleted.

4-1.03B(3) Eliminated Items - The following is to be added: The City reserves the right to eliminate any contract item of work prior to the award of the contract without incurring any obligation to pay therefor. Should any contract item of the work be eliminated in its entirety following the award of the contract and in the absence of an executed contract change order covering such elimination, payment will be made to the Contractor for actual costs incurred in connection with such eliminated contract item if incurred prior to the date of notification in writing by the Engineer of such elimination.

4-1.04 Detours - The following is to be added: Whenever work is performed within the right-of-way of any roadway classified as an "Arterial" or "Collector" type roadway, as defined in these Standard Specifications, a detailed detour plan shall be required.

Clarification questions should be directed to the Traffic Engineering Section of the Public Works Department of the City of Stockton. The plan shall be designed and signed by an engineer registered with the State of California as a Professional Civil or Traffic Engineer. This detour plan shall be submitted to the Public Works Department for approval a minimum of 10 working days before the beginning of any roadwork. The cost of implementing and maintaining the detour plan shall be borne by the Contractor, utility company, or developer.

SECTION 5

CONTROL OF WORK

5-1.01 Authority of Engineer - The following is to be added: Unless otherwise stated, the words *directed, required, permitted, ordered, instructed, designated, considered necessary, prescribed, reviewed, approved, acceptable, satisfactory,* or words of like import, refer to actions, expressions, and prerogatives of the Engineer.

5-1.02 Plans and Working Drawings - The following is to be changed and/or added: Record drawings of all improvements shall be provided by the Contractor involved in constructing the improvement. Record drawings shall be neatly and accurately done on a set of Project Plans and delivered to the Department of Public Works as a condition precedent to acceptance of the project.

The Engineer shall review working drawings before any work involving these plans is performed.

On private development work, at the conclusion of construction, the Engineer who prepared the improvement plans will add to the Project Plans, for City record purposes, construction data based on information compiled and furnished by the Engineer, contractors, inspector and others.

On those facilities that will be extended in the future (such as sanitary lines, storm drain lines, water lines and curb and gutter installations), the Engineer shall shoot the grades at the end of the facilities and include the "as constructed" grades on the record drawings.

5-1.02A Trench Excavation Safety Plans - The following is to supersede Caltrans Specification: Attention is directed to Section 7-1.01E, "Trench Safety." Excavation for any trench 5 feet in depth or more shall not begin until the Contractor has obtained a permit per State of California Construction Safety Orders Section 1539 and Chapter 3.2 Article 2, Section 341 of the California Occupational Safety and Health Regulations (Cal/OSHA). For information regarding this provision Contractor is directed to contact Cal/OSHA in Modesto. A copy of this permit shall be available at the construction site at all times.

5-1.07 Lines and Grades - The following is to be added: The Engineer will set one bench mark on the job site and at the option of the Contractor will either (1) stake the center line, (2) stake an offset line, or (3) stake a base line with necessary grades as required one time only. It is expected that on small projects the City will provide the field services. On all subdivisions, or on large and complicated projects, the special conditions will set forth the extent of field service to be provided by the City and whether or not a licensed surveyor or civil engineer shall perform all or part of the engineering work. On Public Works contracts, however, engineering layout will be provided by the City of Stockton as noted in Items 1, 2,

or 3 above. Where the City of Stockton does provide staking, it shall be preserved carefully by the Contractor and will only be replaced by the City in the case of malicious mischief or vandalism perpetrated by a third party.

The Contractor shall preserve all monumentation potentially affected by the work in accordance with Section 8771 of the Professional Land Surveyors Act in the Business and Professions Code of the State of California. Locations of known existing monumentation within the area of work shall be indicated on the plans. If required, tie-out of existing monuments shall be completed and appropriate documentation submitted to the City Engineer prior to beginning work. Unless otherwise specified, all construction staking or survey work shall be performed by an appropriately licensed land surveyor or civil engineer.

5-1.08 Inspection - Add the following: Projects financed in whole or part with State funds shall be subject to inspection at all times by the State agency involved.

The contractor shall perform all wet weather and dry weather inspections required to determine if all BMPs implemented are adequate and being maintained in accordance with the SWPPP and the requirements of the General Permit. The project site shall be subject to inspection at all times by the City to verify conformance with the General Permit and provisions of the Storm Water Management Program.

5-1.14 Cost Reduction Incentive - This section is expressly deleted and is not applicable to work done for the City of Stockton. This will be applied on a case by case basis and shall be stated in the special provisions.

SECTION 6

CONTROL OF MATERIALS

6-1.02 City Furnished Materials - The following supersedes Caltrans Section 6-1.02 in total: Materials furnished by the City will be available at locations designated in the special provisions or if not designated in the special provisions they will be delivered to the project. Said materials shall be hauled to the site of the work by the Contractor at the Contractor's expense, including any necessary loading and unloading that may be involved. The cost of handling and placing City furnished material shall be considered as included in the price paid for the contract item involving such City-furnished material.

The Contractor will be held responsible for all materials furnished to the Contractor, and he shall pay all demurrage and storage charges. City-furnished materials lost or damaged from any cause whatsoever shall be replaced by the Contractor. The Contractor will be liable to the City for the cost of replacing City-furnished material and such costs may be deducted from any monies due or to become due the Contractor.

6-1.03 Storage of Materials – The following is to be added: Materials shall be stored in such a manner to reduce their potential to pollute storm water run off from the site. Storage practices and storm water management from the storage area shall conform to the BMPs in the SWPPP and the requirements of the General Permit.

6-1.08 Foreign Materials - The following is to be added: The Contractor, at no cost to the City, shall supply the facilities and arrange for any testing required in Stockton which the City is not equipped to perform. All testing by the Contractor shall be subject to witnessing by the Engineer.

Where structural materials requiring mill test reports are obtained from foreign manufacturers, such materials shall be furnished only from those foreign manufacturers who have previously established, to the satisfaction of the Engineer, the sufficiency of their in-plant quality controls, as deemed necessary by the Engineer or his representative, to give satisfactory assurance of their ability to furnish material uniformly and consistently in conformance with these Standard Specifications. At the option of the Engineer, such sufficiency shall be established either by submission of detailed written proof thereof or through in-plant inspection by the Engineer or the Engineer's representative or such testing, by a local laboratory certified to be capable to perform the testing, as is determined to be necessary by the Engineer.

SECTION 7

LEGAL RELATIONS AND RESPONSIBILITY

7-1.01 Laws to be Observed – The following is to be added: The Contractor shall observe and comply with all requirements of the Storm Water Management Program, and the General Permit.

7-1.01A(2) Prevailing Wage - to be added: The general prevailing wage rates for each craft, classification or type of workman are on file at the City Hall, City of Stockton, 425 N. El Dorado Street, Stockton, California. A copy of said wage rates shall be posted by the Contractor in a prominent place at the site of the work.

7-1.01A(4) Labor Nondiscrimination - The following is to be added: Attention is also directed to the requirement in Section 1431 of the Labor Code and sections 300 and 317 through 323 of Title 8 of the California Administrative Code that the Contractor shall submit the Contractor's Equal Employment Opportunity Program and certification fee to the Fair Employment Practice Commission, in the event that the bid price for the contract exceeds $200,000.

Attention is directed to the requirements of the Stockton Municipal Code, Chapter 3, Part V, as amended with reference to the affirmative action requirements for Contractors on Public Works projects of the City of Stockton. Such requirements shall be followed. Guidelines and the necessary reporting requirements are contained in the publication entitled: "City of Stockton Affirmative Action Guidelines" which is made a part of these Standard Specifications by this reference. Failure of the Contractor to conform to the provisions of the City of Stockton's Affirmative Action Program will result in the Contractor's being subject to the penalties set forth in Section 3-028 of Part V of Chapter 3 of the Stockton Municipal Code.

7-1.01A(6) Worker's Compensation - The following is to be added: Pursuant to the requirements of Section 1860 of the Labor Code, the Contractor will be required to secure the payment of Worker's Compensation to the employees in accordance with the provisions of Section 3700 of the Labor Code.

The successful bidder previous to the entering of the contract to do the said work shall take out and maintain in full force and effect worker's compensation insurance with an insurance carrier authorized to transact business in the State of California, covering the bidder's full liability for compensation to any persons employed who may be injured in the carrying out of said contract or the dependents thereof. Evidence of such worker's compensation insurance shall be furnished to the City of Stockton by certificates in duplicate prior to the commencement of the work and said certificate shall contain a provision that the coverage

thereunder will not be canceled until at least thirty (30) days prior written notice has been given to the City.

7-1.01C Contractor's Licensing Laws - The following shall be added: In additions to the Contractor's license, the Contractor shall obtain a business license from the City of Stockton.

7-1.01D Vehicle Code - The following sections of the California State Vehicle Code shall be added: The lighting requirements in Section 25803; the brake requirements in Division 12, the following sections of the State of California Vehicle Code; the splash apron requirements in Section 27600; and, when operated on completed or existing treated base, surfacing, pavement or structures, except as otherwise provided in Section 7-1.02, "Weight Limitations," the weight limitation requirements contained in Division 15. Any other requirements which the City will require compliance with, will be set forth in the special provisions.

7-1.01E Trench Safety - The following shall be added: The Contractor shall furnish all labor, equipment and materials required to design, construct and remove all shoring, sheeting, lagging, cribbing, piling, or types of support for the walls of the project.

In making excavations for any project, the Contractor shall be fully responsible for providing and installing adequate sheeting, shoring and bracing as may be necessary as a precaution against slides or cave-ins and to fully protect all existing improvements of any kind from damage.

The Contractor shall obtain a permit from the Division of Industrial Safety (Cal-OSHA) and shall submit a copy of the approved permit to the City Engineer prior to the start of excavation. The cost of the permit shall be included in the total bid cost. Nothing in this section shall be construed to impose tort liability on the awarding body or any of its employees.

The criteria given by the California Department of Industrial Relations are MINIMAL. In addition to shoring any excavation, it shall be the Contractor's responsibility to provide any and all additional shoring required to support the sides of the excavation against the effects of loads which may exceed those derived by using the criteria set forth by said governing agency. The Contractor shall be solely responsible for any damages which may result from the Contractor's failure to provide adequate shoring to support the excavations under any or all of the conditions of loading which may exist or which may arise during construction.

Full compensation for performing the work described above shall be considered as included in the lump sum payment for "Trench Shoring" and no additional compensation will be allowed therefor.

7-1.01G Water Pollution - The following is to be added: All water pollution control work performed in accordance with the accepted program which is not otherwise required under the contract and which is ordered by the Engineer will be paid for as follows:

1. Such water pollution control work that may be accomplished under the various contract items of work will be measured and paid for as provided for under the contract.

2. Such water pollution control work not covered by contract items will be paid for as extra work as provided for in Section 4-1.03D.

7-1.02 Weight Limitations - The following is to be added: The Contractor will be permitted to operate unladed vehicles and to haul Portland cement concrete for paving on completed cement treated base, provided that:

(1) The cement treated base has cured for 7 days;

(2) Hauling is limited to the lane immediately adjacent to the median in each direction;

(3) Maximum weight limitations set forth in Division 15 of the Vehicle Code are not exceeded; and

(4) Block cracking does not occur under hauling operations.

If block cracking occurs, the Engineer may order said loads to be reduced so that the maximum weight upon any one wheel, or wheels, supporting one end of an axle, and resting upon the roadway, will not exceed 9,000 pounds. The Contractor shall not be entitled to any additional compensation nor extension of contract time by reason of such load reduction.

7-1.06 Safety & Health Provisions - The following shall be added: In all operations connected with the work herein specified, the Contractor shall observe the provisions of the Worker's Compensation and Safety Laws of the State of California, Division IV and V of the Labor Code, and shall use all of the accepted and best safety practices for the public and/or the Contractor's employees.

7-1.07 Sanitary Provisions - The following is to be added: The Contractor shall conform to the rules and regulations pertaining to sanitary provisions established by the State of California as may be applicable.

7-1.08 Public Convenience - The following is to be added: Adequate ingress and egress shall be maintained for fire, police and other emergency vehicles. Adequate ingress and egress shall be maintained at all times for residents, property owners, and business owners.

The Contractor may be required to cover certain signs which regulate or direct public traffic to roadways that are not open to traffic.

In the event of a suspension of the work, attention is directed to Section 8-1.05, "Temporary Suspension of Work."

7-1.09 Public Safety - The flagmen shall perform their duties, and the work of furnishing and placing such signs, lights, flags, and other warning and safety devices shall all be performed as set forth in the current "Work Area Traffic Control Handbook" as published by Building News, Inc., Los Angeles, California (310-202-7775, 8:30 AM.-5 PM, M-F).

All safety devices and their maintenance shall conform to the latest requirements of Cal-OSHA and to the applicable provisions of the "Work Area Traffic Control Handbook."

7-1.092 Lane Closure - The following is to be added: Whenever a lane closure is made, the Contractor shall close the lane by placing fluorescent traffic cones, portable delineator, or other devices reviewed by the Engineer, along a taper and along the edge of the closed lane adjacent to public traffic. One telescoping flag tree with flags shall be placed at the beginning and at the end of the taper.

Fluorescent traffic cones shall be of good commercial quality, flexible material suitable for the purpose intended. The outer section of the portion above the base of the cone shall be at least 28 inches. The base shall be of sufficient weight and size or shall be anchored in a manner such that the traffic cone will remain in an upright position.

Portable delineators shall conform to the provisions in Section 7-1.093, "Portable Delineators."

If the traffic cones or portable delineators are damaged, displaced or are not in an upright position from any cause, said cones or portable delineators shall immediately be replaced or restored to their original location, in an upright position, by the Contractor.

Telescoping flag trees shall be of good commercial quality material, suitable for the purpose intended and shall be capable of maintaining an upright position at all times while in use.

The fluorescent traffic cones or portable delineators shall be placed at intervals as directed by the Engineer, but not to exceed 50 feet.

If the work requires that fluorescent traffic cones or portable delineators be placed in the lane open to public traffic, said cones or portable delineators shall be placed on a 1-1/2 foot width of the lane open to traffic along the side adjacent to the lane to be closed.

Traffic cones or portable delineators, telescoping flag trees with flags, and signs shall be placed before beginning work each day and shall be removed from the site of the work at the end of each working day.

The contractor shall specify the time limits of lane closure upon approval by the City Engineer.

Full compensation for furnishing, placing, maintaining and removing the traffic cones and telescoping flag trees with flags required for lane closure, shall be considered as included in the contract prices paid for the items of work requiring the lane closure and no separate payment will be made therefor.

The provisions for lane closure in this Section 7-1.092 will nowise relieve the Contractor from the Contractor's responsibility to provide such devices or measures as may be necessary to comply with Section 7-1.09, "Public Safety."

7-1.093 Portable Delineators - The following is to be added: Portable delineators shall be furnished, placed and maintained in accordance with the provisions in Section 7-1.08, "Public convenience," and 7-1.09, "Public Safety," and as provided in the special provisions.

Portable delineators, including the base shall be composed of a material that has sufficient rigidity to remain upright when unattended and shall be either flexible or collapsible upon impact by a vehicle. The base shall be of such shape as to preclude roll after impact. The base shall be sufficient weight or shall be anchored in a manner such that said delineator shall remain in an upright position.

If the portable delineators are damaged, displaced or are not in an upright position, from any cause, said delineators shall immediately be replaced or restored to their original location, in an upright position, by the Contractor.

The vertical portion of the portable delineators shall be of a brilliant orange or predominantly orange color. The posts shall be not less than 2-1/4 inches in width or diameter or, if tapered, shall have a cross-sectional area of not less than 100 square inches, measured, through the vertical axis of the delineator normal to the roadway. The minimum height shall be 37 inches above the traveled way.

Two 4-inch nominal width reflective bands shall be mounted a minimum 1-1/2 inches apart and at a height on the post so that one reflective band will be between 2.5 feet and 3 feet above the roadway surface.

Reflective bands shall conform to the following:

Reflective bands shall be flexible vinyl plastic, either white or yellow, and shall have not less than the following dry reflectance values at a 0.2 degree divergence angle, expressed in units of candlepower per foot candle square foot. The wet reflectance values shall not be less than 90 percent of the dry values.

Dry Reflectance Value

Angle of Incidence	4°	15°	30°
White	250	165	50
Yellow	150	110	30

All tests for reflectance value shall be performed in accordance with Test Method No. Calif. 642.

Only one type of portable delineator shall be used on the project. The type of portable delineator proposed for use on the project shall be submitted to the Engineer for approval prior to placement on the project.

When work is in progress in a trench or other excavation adjacent to the traveled way, the portable delineators shall be placed on the edge of pavement. At other times, the portable delineators shall be placed off of and adjacent to the edge of pavement.

The portable delineators shall be spaced as necessary for proper delineation as directed by the Engineer but not to exceed 50 feet.

The requirements in this Section 7-1.093 will in no way relieve the Contractor from the Contractor's responsibility to provide such devices or measures as may be necessary to comply with the provisions in Section 7-1.09, "Public Safety."

When no longer required for delineation, the portable delineators shall be removed from the site of the work. Full compensation for conforming to the requirements of this section shall be considered as included in the prices paid for the various contract items of work and no additional compensation will be allowed therefor.

7-1.094 Use of Private Property - The following is to be added: Should the Contractor intend to use privately owned property for the storage of any type of material, or equipment, or for vehicle parking or for any other purpose related to the work, the Contractor shall make the necessary arrangements and shall, precedent to such use, provide the Engineer with satisfactory written evidence that the owner of such property has granted permission of such uses. Prior to the final acceptance of the work, the Contractor also shall provide to the

Engineer an acceptable written release from such owner indicating that all of the conditions of such agreement are satisfied.

7-1.12 Indemnification and Insurance - The following is to be added: The duty of the Contractor to indemnify and save harmless, as set forth herein, shall include the duty to defend, as set forth in Section 2778 of the California Civil Code provided, however, that nothing herein shall be construed to require the Contractor to indemnify the City against any responsibility or liability in contravention of Section 2782 of the California Civil Code, including any loss arising from design defect which is the result of the sole negligence of the City.

The Contractor shall, during the life of the contract, take out and maintain insurance coverage with an insurance carrier authorized to transact business in the State of California as will protect the Contractor or any subcontractor or anyone directly or indirectly employed by any of them or by anyone for whose acts any of them may be liable, from claims for damages because of bodily injury, sickness, disease, or death of the Contractor's employees or any person other than the Contractor's employees, or for damages because of injury to or destruction of tangible property, including loss of use resulting therefrom. Contractor shall be aware that the maintenance of proper insurance coverage is a material element of a contract with the City and that failure to maintain or renew coverage or to provide evidence of renewal may be treated as a material breach of contract.

The minimum limits of liability for such insurance coverage which shall include commercial general and automobile liability, including contractual liability assumed under the contract, shall be as follows:

1. Limit of Liability for Injury or Accidental Death

One Person	$1,000,000
One Accident or Occurrence	$1,000,000

2. Limit of Liability for Property Damage

Aggregate Liability for Loss	$1,000,000

Such liability insurance policies shall name the City as an additional insured by separate endorsement and shall agree to defend and indemnify the City against loss arising from operations performed under the contract and before permitting any subcontractors to perform work under the contract, the Contractor shall require subcontractors to furnish satisfactory proof that insurance has been taken out and is maintained similar to that provided by the Contractor as it may be applied to the subcontractor's work.

The Contractor shall, during the life of the contract, effect and maintain standard form builder's risk property insurance coverage with an insurance carrier authorized to business in

the State of California, which shall include extended coverage, malicious mischief, vandalism, and windstorm coverage, and such coverage shall be applicable to those portions of the work that are subject, but not limited to, fire, theft, and vandalism. Coverage shall be the amount of one hundred percent (100%) of the insured value thereof, including surplus materials and supplies incident to the work, and such scaffoldings, stagings, towers, forms and equipment as are not owned or rented by the Contractor, the cost of which is included in the cost of the work but shall not cover any tools owned by mechanics, any tools, equipment, scaffolding, staging, towers, and forms owned or rented by the Contractor, the capital value of which is not included in the cost of the work. The City shall be named as loss payee with the Contractor in such builder's risk property insurance policies and they shall be open to City's inspection upon City's request. The foregoing Builders Risk Insurance will not be required on work being performed exclusively on public street right-of-ways or utility easements.

The City and the Contractor waive all rights against each other for damages caused by fire or other perils to the extent covered by insurance under such builder's risk property policies, except such rights as they may have to the proceeds of such insurance coverage and the Contractor shall require similar waivers by subcontractors.

If the Contractor fails to effect and maintain the required builder's risk property insurance coverage, the City may insure its own interest. The City may deduct the cost of taking out, effecting and maintaining such liability and/or builder's risk property insurance coverages from any sums which may be due, or become due, to the Contractor, under the contract.

Evidence of both liability and builder's risk property insurance coverages shall be furnished to the City with form of certificates with endorsements prior to the commencement of the work and said certificates with endorsements shall contain a provision that the coverage or coverages thereunder will not be canceled until at least thirty (30) days prior written notice has been given to the City. The form of the Certificate of Insurance shall be as shown on the following pages of these Standard Specifications.

BROKER/AGENT
INSURANCE CHECK LIST

Instructions: *Please follow the format below for issuing the Certificate of Insurance to the City of Stockton. Broker/Agent must return completed certificates and endorsement to Risk Management – 425 North El Dorado Street, Stockton, CA 95202, prior to the start of any job.*

General Contract Information:

- Name of Individual/Company: _____
- Address of Individual/Company: _____
- Contact Person: _____ Telephone: _____

PLEASE LIST THE FOLLOWING INFORMATION ON THE CERTIFICATE OF INSURANCE IN THE AREA TITLED "DESCRIPTION OF OPERATIONS."

- Contract Effective Date: ____/____/____
- Contract Expiration Date: ____/____/____
- Job Title: _____

Risk Management Requirements:

Fax completed Certificate of Insurance and "Additional Insured" Endorsement with original mailed to:

CITY OF STOCKTON
425 N. EL DORADO STREET
STOCKTON, CA 95202
(209) 937-8833 – FAX
(209) 937-8629 - OFFICE

SAMPLE CERTIFICATE AND ENDORSEMENT ATTACHED

NOTE: BROKER IS RESPONSIBLE FOR NOTIFYING THE CITY OF STOCKTON IF ANY CHANGES IN INSURANCE OR EXPIRATION OF INSURANCE TAKES PLACE.

ACORD CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YY)

PRODUCER

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW.

INSURERS AFFORDING COVERAGE

INSURED

INSURER A:

INSURER B.

INSURER C.

INSURER D.

INSURER E.

COVERAGES

THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. AG6REGATE LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YY)	POLICY EXPIRATION DATE (MM/DD/YY)	LIMITS	
	GENERAL LIABILITY				EACH OCCURRENCE	$
	☐ COMMERCIAL GENERAL LIABILITY				FIRE DAMAGE (Any one fire)	$
	☐ ☐ CLAIMS MADE ☐ OCCUR				MED EXP (Any one person)	$
	☐ _____				PERSONAL & ADV INJURY	$
	☐ _____				GENERAL AGGREGATE	$
	GEN'L AGGREGATE LIMIT APPLIES PER:				PRODUCTS - COMP/OP AGG	$
	☐ POLICY ☐ PRO-JECT ☐ LOC					
	AUTOMOBILE LIABILITY				COMBINED SINGLE LIMIT (Ea accident)	$
	☐ ANY AUTO				BODILY INJURY (Per person)	$
	☐ ALL OWNED AUTOS				BODILY INJURY (Per accident)	$
	☐ SCHEDULED AUTOS				PROPERTY DAMAGE (Per accident)	$
	☐ HIRED AUTOS					
	☐ NON-OWNED AUTOS					
	☐ _____					
	☐					
	GARAGE LIABILITY				AUTO ONLY - EA ACCIDENT	$
	☐ ANY AUTO				OTHER THAN AUTO ONLY: EA ACC	$
	☐				AGG	$
	EXCESS LIABILITY				EACH OCCURRENCE	$
	☐ OCCUR ☐ CLAIMS MADE				AGGREGATE	$
						$
	☐ DEDUCTIBLE					$
	☐ RETENTION $					$
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY				WC STATU-TORY LIMITS ☐ OTH-ER	
					E.L. EACH ACCIDENT	$
					E.L. DISEASE - EA EMPLOYEE	$
					E.L. DISEASE - POLICY LIMIT	$
	OTHER					

DESCRIPTION OF OPERATIONS/LOCATIONSIVEHICLES/EXCLUSIONS ADDED BY ENDORSEMENT/SPECIAL PROVISIONS

CERTIFICATE HOLDER | ADDITIONAL INSURED; INSURER LETTER:

CITY OF STOCKTON, RISK MGMT. DIVISION
CITY HALL ANNEX
6 EAST LINDSAY STREET
STOCKTON, CA 95202

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING INSURER WILL MAIL 30 DAYS WR NOTICE TO THE CERTIFICATE HOLDER NAMED TO THE LEFT.

AUTHORIZED REPRESENTATIVE

(DACORD CORPORATION 1988

INSURED:

POLICY NUMBER: COMMERCIAL GENERAL LIABILITY

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY

ADDITIONAL INSURED--OWNERS, LESSEES OR CONTRACTORS (FORM B)

This endorsement modifies insurance provided under the following:

COMMERCIAL GENERAL LIABILITY COVERAGE PART.

SCHEDULE

Name of Person or Organization:
CITY OF STOCKTON, ITS OFFICERS, AGENTS AND EMPLOYEES
425 N. EL DORADO STREET
STOCKTON, CA 95202-1997

(If no entry appears above, information required to complete this endorsement will be shown in the Declarations as applicable to this endorsement.)

WHO IS AN INSURED (Section II) is amended to include as an insured the person or organization shown in the Schedule, but only with respect to liability arising out of "your work" for that insured by or for you.

Signature
Authorized Representative

CG 20 10 85 Copyright, Insurance Services Office, Inc., 1984

CG 20 10 85

7-1.125 Legal Actions Against the City - In the event litigation is brought against the City concerning compliance by the City with State or Federal laws, rules, or regulations applicable to highway work, the provisions of this Section 7-1.125 shall apply.

7-1.13 Disposal of Materials Outside the Street or Other Right of Way - The following is to be added: Material disposal shall be in accordance with the requirements of the General Permit and/or the SWPPP, including the erosion and sediment control and post-construction storm water management requirement.

7-1.15 Relief from Maintenance and Responsibility - Delete the entire section in Caltrans and replace it with the following: Upon the request of the Contractor, the Director may relieve the Contractor of the duty of maintaining and protecting certain portions of the work which have been completed in all respects in accordance with the requirements of the contract and to the satisfaction of the Engineer, and thereafter except with the Contractor's consent, the Contractor will not be required to do further work thereon. In addition, such action by the Director will relieve the Contractor of responsibility for injury or damage to said completed portions of the work resulting from use by public traffic or from the action of the elements or from any other cause but not from injury or damage resulting from the Contractor's own operations or from the Contractor's negligence.

However, nothing in this Section 7-1.15 providing for relief from maintenance and responsibility will be construed as relieving the Contractor of full responsibility for making good defective work or materials found at any time before the formal written acceptance of the entire contract by the Director.

7-1.165 Damage by Storm, Flood, Tidal Wave or Earthquake - The following is to be added: G. Termination of Contract - If the City determines to terminate the contract and relieve the Contractor of further obligation to perform the work, a contract change order so providing will be issued. Such change orders may provide for the Contractor to perform any work deemed by the Engineer as necessary to put the project in satisfactory condition for the termination of all work, and the Contractor will be paid for such work in accordance with Section 9-1.03, "Force Account Payment." Upon the issuance of such change order the Contractor will be relieved of further responsibility for damage to the work (excluding materials) as specified in Section 7-1.16, "Contractor's Responsibility of the Work and Materials," and will not be required to perform any further work on the project other than that specified in the change order.

When the Engineer determines that the work specified in the change order has been completed, the Engineer will proceed as set forth in Section 7-1.17, "Acceptance of Contract," and the Contractor will not be required to perform any further work thereon, and shall be relieved of the Contractor's responsibility for injury to persons or property.

Payment after acceptance will be subject to the provisions in Section 9-1.07, "Payment After Acceptance." The Contractor will be paid for the work done prior to the Occurrence (as defined in Section 7-1.165 of Caltrans specifications) at the applicable contract prices; the Engineer will determine the value of partially completed work by apportioning such price. If the Contractor has placed orders prior to the Occurrence for materials specially manufactured for the project and which are not suitable for use in other City projects or sale to others in the ordinary course of the seller's business, the Contractor will be paid the actual cost to the Contractor for such material or the cancellation charges, if any, for such order made by the vendor. The determination of whether the order shall be completed or canceled shall be made by the Engineer. Any material paid for shall become the property of the City and actual cost of any further handling will be paid for. The actual cost or charges to be paid will be computed in the same manner as if the work were to be paid for on a force account basis, as provided in Section 9-1.03, "Force Account Payment." No payment will be made for materials which have been damaged and are not acceptable for incorporation in the work in accordance with the requirements of the contract. The Contractor shall pay the City any amounts previously paid for such unacceptable material, and agrees that the City may deduct the amount thereof from any moneys due or which may become due to the Contractor under the contract.

7-1.17 Acceptance of Contract - The following is to be added: When the Engineer has made the final inspection as provided in Section 5-1.13, "Final Inspection," and determines that the contract work has been completed in all respects in accordance with the Standard Specifications and Plans, the Engineer will file a "Notice of Completion" with the County Recorder and immediately upon and after such filing, the Contractor will be relieved of the duty of maintaining and protecting the work as a whole, and will not be required to perform any further work thereon, and the Contractor shall be relieved of the Contractor's responsibility for injury to persons or property or damage to the work which occurs after such filing.

7-1.21 Repair of Equipment – The following is to be added: Maintenance practices shall be in accordance with the BMPs in the SWPPP and requirements of the General Permit.

7-1.23 Guaranty (General) - The following is to be added: The Contractor hereby unconditionally guarantees that the work will be done in accordance with the requirements of the contract, and further guarantees the work of the contract to be and remain free of defects of workmanship and materials for a period of one (1) year from the date of acceptance of the work as complete, unless a longer guarantee period is specifically required. The Contractor hereby agrees to repair or replace any and all work, together with any other adjacent work which may be displaced in so doing, that may prove to be not in accordance with the requirements of the contract or that may be defective in its workmanship or material within the guarantee period specified, without any expense whatsoever to the City, ordinary wear and tear and unusual abuse or neglect excepted.

Contract bonds are to be in full force and effect during the guarantee period.

The Contractor further agrees, that within ten (10) calendar days after being notified in writing by the Department of Public Works of any work not in accordance with the requirements of the contract or any defects in the work, the Contractor will commence and prosecute with due diligence all work necessary to fulfill the terms of this guarantee, and to complete the work within a reasonable period of time, and in the event the Contractor fails to so comply, the Contractor does hereby authorize the City to proceed to have such work done at the Contractor's expense and the Contractor will pay the cost thereof upon demand. The City will be entitled to all costs, including reasonable attorneys fees, necessarily incurred upon the Contractor's refusal to pay such costs.

Notwithstanding the foregoing paragraph, in an event of an emergency constituting an immediate hazard to the health and safety of the City's employees, property or the public at large, the City may undertake at the Contractor's expense without prior notice all work necessary to correct such hazardous condition when it was caused by work of the Contractor not being in accordance with contract requirements.

7-1.24 Guarantees (Specific) - The following is to be added: In addition to the general guarantee specified in Section 7-1.23, certain specific guarantees or warranties in excess of one year may be required by the special conditions. In such case, the items of work requiring specific guarantees shall be listed in the general conditions together with the various specified tenures of guarantee.

The Contractor shall provide a written guarantee for those items specified in the special provisions. The form of the guarantee shall be approved by the City. A separate guarantee shall be provided for each item, and shall include the scope and tenure as specified in the special provisions. The guarantee shall be signed by the general Contractor and by the Subcontractor or supplier who furnished materials or did work on the item.

Irrespective of counter-signature on the guarantee form, it shall be the general Contractor's responsibility to replace any work, together with any other adjacent work displaced in so doing which may be necessary to comply with the terms of the contract or which may be defective in workmanship or material. For the purposes of this section, the City will only recognize the Subcontractor or supplier as an employee of the General Contractor.

Special non-cancelable bonds shall be provided by the General Contractor or the General Contractor's Subcontractor or supplier to hold specific guarantees or warranties in effect for the specified tenure and in a specified amount agreeable to the Director of Public Works.

Said forms shall be signed, notarized and delivered to the Director of Public Works along with the special bonds required prior to any final retention payment to the Contractor.

SECTION 8

PROSECUTION AND PROGRESS

8-1.01 Subcontracting - The following is to be added to the third paragraph: The Engineer may also determine, on a case by case basis, items to be designated "Specialty Items." Where an entire item is subcontracted, the value of work subcontracted will be based on the contract item bid price.

8-1.02 Assignment - The following is to be added: No contract or portion thereof may be assigned without consent of the City of Stockton except that the contractor may assign money due, or which will accrue to them, under the contract. If given written notice, such assignment will be recognized by the City of Stockton to the extent permitted by law, but any assignment of money shall be subject to all proper setoffs and withholdings in favor of the City of Stockton and to all deductions provided for in the contract. All money withheld, whether assigned or not shall be subject to being used by the City of Stockton for completion of the work, should the contract be in default.

8-1.03 Beginning of Work - The following includes changes and/or additions: The Contractor shall begin work after the contract has been approved by the City Attorney and within ten (10) days after being given notice to proceed or otherwise as may be stated in the Special Provisions. Once started the Contractor shall diligently prosecute the same to completion within the time limit provided in the special provisions.

The Contractor shall arrange a pre-construction conference with the Public Works Department. Notice shall be given to the Public Works Department at least 72 hours in advance of the Contractor's intent to have a pre-construction conference. No work may be performed prior to a pre-construction conference.

The following is to be added:

(See Caltrans Standard Specifications for numbers (1) through (4))

(5) Notice in writing of the Contractor's intentions to start work prior to approval, specifying the date on which the Contractor intends to start, shall be given to the Engineer at least 24 hours in advance.

(6) Attending a pre-construction conference.

8-1.06 Time of Completion - The following is to supersede Caltrans Specifications: A working day is defined as any day, except Saturdays, Sundays, and City of Stockton legal holidays and days on which the Contractor is specifically required by the special provisions to suspend construction operations, and except days on which the Contractor is prevented by

inclement weather or conditions resulting immediately therefrom adverse to the current controlling operation or operations, as determined by the Engineer, from proceeding with at least 75 percent of the normal labor and equipment force engaged on such operation or operations for at least 60 percent of the total daily time being currently spent on the controlling operation or operations.

Should the Contractor choose to work on a Saturday, Sunday, or on a holiday recognized by the Labor Unions and/or the City, the Contractor shall reimburse the City of Stockton the actual cost of engineering, surveying, inspection, superintendence, and/or other overhead expenses which are directly chargeable to the contract. Should such work be undertaken at the request of the City, reimbursement will not be required.

8-1.08 Termination of Control - The following contains a change: The Contractor will be required to cooperate with the utilities and others during the rearrangement of utility and other improvements or street facilities, and any delay caused by the rearrangement will not be considered as right of way delays.

SECTION 9

MEASUREMENT AND PAYMENT

9-1.00 Lump Sum Contracts - The following is to be added: When required by the Special Provisions or requested by the Engineer, the Contractor shall submit to the Engineer within 15 days after award of contract, a detailed schedule in triplicate, to be used only as a basis for determining progress payments on a lump sum contract or any designated lump sum bid item. This schedule shall equal, in total, the lump sum bid and be in such form and sufficiently detailed as to satisfy the Engineer that it correctly represents a reasonable apportionment of the lump sum.

9-1.045 Determination of Rights - The following includes changes and/or additions: If the total monetary amount of all the Contractor's claims arising under or by virtue of the contract does not exceed $25,000, such claims are subject to determination of rights under the contract by a hearing officer of the City Council of the City of Stockton.

The party seeking a determination of rights shall give notice in writing of the claim to the other party and to the City Council of the City of Stockton, setting forth therein the facts on which the claim is based. Such notice shall be given not later than 6 months after the issuance of the final estimate.

The City Council of the City of Stockton will appoint a hearing officer to hear such claim within 60 days after such notice but not before completion of the contract unless the City consents to earlier appointment. The hearing officer will hear and determine the controversy and render the hearing officer's decision in writing within 60 days after the hearing officer's appointment unless otherwise agreed to by the parties or unless for good cause the hearing officer extends such time. Each party shall bear its own costs and shall pay 1/2 of the cost of the hearing.

Rules and regulations adopted by the City Council of the City of Stockton pursuant to Section 14380 of the Government Code will govern the conduct of the hearings, including requirements as to pleadings and other documents to be filed. The rules and regulations may be obtained from the City Council of the City of Stockton.

Compliance with the notice requirements of this section does not relieve the Contractor of responsibility for complying with any notice or protest requirements specified in these Standard Specifications (e.g., Sections 4-1.03, "Changes," 8-1.06, "Time of Completion," 8-1.07, "Liquidated Damages," and 9-1.04, "Notice of Potential Claim") nor does compliance with the notice requirements of this section relieve the Contractor of responsibility for complying with the claims submission requirements in Section 9-1.07B, "Final Payment and Claims."

The notices required by this section shall be sent as follows: (a) to the City Council of the City of Stockton, 425 N. El Dorado Street, Stockton, California 95202; (b) to the Department; (c) to the Contractor: such notices will be sent to the business address set forth in the proposal.

If the address to which the notice to the City Council of the City of Stockton or to the Department is to be changed, the Department will notify the Contractor in writing of such change. The Contractor may change the address to which such notices are to be sent to the Contractor by giving the Department written notification of such change of address.

9-1.06 Partial Payments - Delete all of the third paragraph which states "The Department shall retain...file with the Department." Replace the third paragraph with the following: The City shall retain 10% of such estimated value of the work done and 10% of the value of materials so estimated to have been furnished and delivered and unused or furnished and stored as aforesaid as part security for the fulfillment of the contract by the contractor.

The 10% retention will remain with the City until 35 days after the date the notice of completion was recorded on.

9-1.07B Final Payment and Claims - Delete all of Section 9-1.07B from Caltrans Specifications and replace it with the following changes and additions:

After the work is completed, the Engineer will provide a proposed balancing change order, in writing, stating the total amount payable to the Contractor, including therein an itemization of said amount, segregated as to contract item quantities, extra work and any other basis for payment, and shall also show therein all dedications made or to be made for prior payments and amounts to be kept or retained under the provisions of the contract. All prior estimates and payments shall be subject to correction in the proposed balancing change order. The Contractor shall check the balancing change order and submit a written statement of all claims the Contractor has arising under or by virtue of the contract. No claim will be considered that was not included in which a notice or protest is required under the provision in Sections 4-1.03 "Changes," 8-1.06 "Time of Completion," 8-1.07 "Liquidated Damages," 8-1.10 "Utility and Non-Highway Facilities," and 9-1.04 "Notice of Potential Claim," unless the Contractor has compiled with the note or protest requirements in said sections. On the Contractor's approval, or if the Contractor files no claim prior to signing the balancing change order, the following will take place:

1. The balancing change order, when signed by the Contractor, indicates that the Contractor agrees to the quantities contained therein as final quantities and the City of Stockton is then to pay up to 90%of the entire contract.

2. At this time, the City will file the Notice of Completion, which constitutes their acceptance of the work.

3. Thirty-five (35) days after the date the Notice of Completion is recorded, the Retention will be released and constitutes the final payment for the work.

If the Contractor files claims prior to signing the balancing change order, the City will revise the balancing change order accordingly if the claims are approved. Such balancing change order and payment shall be conclusive and binding against both parties to the contract on all questions relating to the amount of work done and the compensation payable therefor except as otherwise provided in Sections 9-1.03C "Records," and 9-1.09 "Clerical Errors."

The claims filed by the Contractor shall be in sufficient detail to enable the Engineer to ascertain the basis and amount of said claims. The Engineer will consider and determine the Contractor's claims and it will be the responsibility of the Contractor to furnish within a reasonable time such further information and details as may be required by the Engineer to determine the facts or contentions involved in the Contractor's claims. Failure to submit such information and details will be sufficient cause for denying the claims.

The Director of Public Works will make the final determination of any claims, which remain in dispute after review by the Engineer administering the contract. A board or person designated by said Director will review such claims and make a written recommendation thereon. The Contractor may meet with the Review Board or their staff to make a presentation in support of such claims.

Upon final determination of the claims, the Engineer shall then make and issue the Engineer's final balancing change order in writing and within 30 days thereafter the City will pay the entire sum, if any, found due thereon. Such final balancing change order shall be conclusive and binding against both parties to the contract on all questions relating to the amount of work done and the compensation payable therefor, except as otherwise provided in Sections 9-1.03C "Records," and 9-1.09 "Clerical Errors."

9-1.08 Adjustment of Overhead Costs - This section in Caltrans specifications is to be deleted and is not applicable to projects with the City of Stockton, unless specified otherwise.

SECTION 16

CLEARING AND GRUBBING

The following is added to Section 16-1.03 of the Caltrans Standard Specifications:

Where roots of existing trees are to be pruned, the following specification shall be followed:

All roots pruned shall be cut as smooth as possible with the least amount of surface wood exposed or at a 90 degree angle to the root end cut.

All root cuts made over one (1) inch in diameter shall be painted to seal with an approved type of tree seal paint.

SECTION 19

EARTHWORK

The following is to be added:

19-1.01 General - Lime stabilization may be acceptable as part of roadway structural section design, subject to approval by the Engineer. If approved, Lime Stabilization shall be in conformance with SECTION 24: LIME STABILIZATION.

19-3.066 Controlled Density Fill - CDF will be accepted in lieu of the standard backfill specifications. It shall be mandatory in all situations where the prevention of subsequent settlement after placement of backfill is required and in trenches eight (8) inches wide or less.

19-3.066A Strength Requirements - Non-structural controlled density fill that can be excavated by hand shall produce unconfined compressive 28-day strengths from 50 psi to a maximum of 200 psi. Controlled density fill that is to be excavated by hand shall contain aggregate no larger than 3/8" top size nor shall the 3/8" aggregate comprise more than 30% of the total aggregate content.

Structural controlled density fill shall produce unconfined compressive 28 day strengths from 200 - 1,200 psi, as determined by the project requirements. Coarse aggregate top size and coarse to fine aggregate ratios and contents shall be determined by the clearances surrounding embedded members and the workability requirements.

19-3.066B Materials - Cement shall meet the standards as set forth in ASTM C-150, Type II Cement.

Fly ash shall meet the standards as set forth in ASTM C-618, for Class F pozzolans. The fly ash shall not inhibit the entrapment of air.

Air entraining agent shall meet the standards as set forth in ASTM C-260.

Aggregates need not meet the standards as set forth in ASTM C-33. Any aggregate, producing performance characteristics of the CDF, for any project will be accepted for consideration as follows. The amount of material passing a #200 sieve shall not exceed 12% and no plastic fines shall be present.

19-3.066C Mix Proportions - CDF shall be a mixture of cement, Class F pozzolan, sometimes coarse aggregate, air entraining agent and water. CDF shall be batched by a ready mixed concrete plant and delivered to the job site by means of transit mixing trucks.

The actual mix proportions shall be determined by the producer of the controlled density fill to meet job site conditions, minimum and maximum strengths and unit weight. Entrained air content shall be established for each job with the materials and aggregates to be used to meet the placing and unit weight requirements. Entrained air content may be as high as 20% for fluidity requirements.

19-3.066D Placement - CDF shall be discharged from the mixer by any reasonable means into the area to be filled. CDF shall be brought uniformly to the elevation as shown on the Standard Plans. Trench sections to be filled with CDF shall be contained at either end by bulkheads of earth fill.

All CDF is to be protected (plated) from traffic loading for at least 72 hours. Exception 4-inch wide trenches need not be plated but may not be paved for 72 hours. All CDF is to be protected from freezing for at least 72 hours after placement and may not be placed at temperatures less than 40F. Nonstructural CDF is to be used for installations that may require future maintenance.

19-3.066E Mix Design - Mix design shall be reviewed and approved by the Engineer.

Structural (200-1200 psi) (current spec 150-1200 psi)

With Aggregate
- 100 lbs Cement
- 450 lbs Fly Ash
- 342 lbs (41 gal) Water
- 1800 lbs Sand
- 815 lbs Pea Gravel

Without Aggregate (4-inch wide trenches)
- 100 lbs Cement
- 450 lbs Fly Ash
- 342 lbs (41 gal) Water
- 2625 lbs Sand

Nonstructural (50-200 psi) (current spec 50-150 psi)

With Aggregate
- 50 lbs Cement
- 400 lbs Fly Ash
- 342 lbs (41 gal) Water
- 1900 lbs Sand
- 815 lbs Pea Gravel

Without Aggregate (4-inch wide trenches)

50 lbs Cement
400 lbs Fly Ash
342 lbs (41 gal) Water
2725 lbs Sand

Note: Sand and pea gravel weights are dry weights. For all mixes, slump is greater than 8-inches. These are known to be loose, self-consolidating product / process. If for some reason a lower slump (stiffer mixture) is desired, the mix design and work process must be submitted for approval.

The engineer will select the appropriate mix design for the application at the site. The typical mix designs may be modified to suit local conditions and materials.

The following is substituted in place of Sections 19-5.03 and 19-5.04 of the Caltrans Standard Specifications:

19-5.03 Relative Compaction (95 Percent) - A Relative Compaction of not less than 95 percent shall be obtained for a minimum depth of 6 inches (0.5 foot) below the grading plane for the full width of any street and trench section.

19-5.04 Relative Compaction (90 Percent) - A Relative Compaction of not less than 90 percent shall be obtained in all material except as specified herein to be 95 percent or as may be otherwise specified in the Special Provisions, contract plans, or in the City of Stockton Standard Specifications and Plans.

SECTION 24

LIME STABILIZATION

The following are to be added to the appropriate sections of Section 24 of the Cal Trans Standard Specifications:

24-1.03 General – Add the following:

The use of lime stabilization shall be subject to submittal of a mix design prepared by a Contractor-provided licensed geotechnical engineer and approval of same by the Engineer. The approved mix design shall be based on the actual soils to be used and shall specify the type and amount of lime and the type and amount of curing seal to be applied.

The maximum allowable R-value attributable to lime-stabilized soil for purposes of roadway structural design shall be 50.

The maximum allowable design compressive strength attributable to lime-stabilized soil shall be 200 psi.

The gravel equivalency factor for lime-stabilized soil shall be 1.1.

The in-place moisture content of the soil immediately below the lime-stabilized layer shall be maintained above the optimum moisture content, as determined by California Test 373, prior to application of the lime.

A minimum of 4" of aggregate base shall be installed between lime-stabilized soil and asphalt concrete paving unless otherwise approved by the Engineer.

The preparation, spreading, mixing, compaction, rolling, grading and curing of lime-stabilized soil shall be completed under the observation of a Contractor-provided licensed geotechnical engineer who shall submit a Certificate of Compliance, in conformance with SECTION 6-1.07 CERTIFICATE OF COMPLIANCE, for the lime-stabilized soil prior to acceptance by the City.

24-1.05 Spreading - Add the following:

The area to be stabilized by lime treatment shall extend a minimum of two feet beyond the edge of pavement.

24-1.06 Mixing - Add the following:

The minimum depth of lime-stabilized soil shall be 12 inches. An additional three inches of lime-stabilized soil shall be added to all roadway structural design sections as a safety factor.

24-1.07 Compaction – Replace with the following:

Lime-stabilized soil shall be compacted to a relative compaction of not less than 95%.

SECTION 39

ASPHALT CONCRETE

The following is added to Section 39 of the Cal Trans Standard Specifications:

39-9.01 Full Depth Asphalt Concrete - Where a Full Depth section is specified, it shall be placed on a previously prepared subgrade as specified in 19-5.03 (Relative Compaction) to a tolerance of 0.05 foot above or below the subgrade established by the Engineer.

The final grade of the lift below the surfacing course shall not vary more than 0.05 foot above or below the planned grade for that course. The finished surface grade tolerance shall conform to Section 39-6.03 Compacting.

The thickness of the surface course shall be as specified in the Special Provisions, all other asphalt concrete below this point is considered base course.

Tack coat (paint binder) shall be SS-1h or CSS-1h type emulsion conforming to Caltrans Specifications Section 94 of the Standard Specifications. Tack coating as covered in Section 39-4.02, Paragraph 6 will be required before placement of the surface course. Tacking between base courses required at the rate of 0.01 to 0.03 gallons per square yard, if clean, heavier if dirty. Application in excess of .03 gallon per square yard will be at Contractor's expense.

Where Full Depth sections are placed in existing streets with established gutter sections, a continuous wedge shape section of asphalt paving shall be placed against the gutter edge, held below the gutter lip by the amount of the thickness of the surface course and feathered to subgrade in a width of not less than three feet before placement of the level courses, unless otherwise permitted by the Engineer.

Upon completion of all portions of the construction, including utility grade adjustments to finish grade, the surface course shall be placed, gutter lip to gutter lip, for the entire length of the project to provide a smooth uniform riding surface with a minimum of transverse joints for the entire project.

Paving shall feather smoothly into existing pavement. Side street construction shall have a section varying from a uniform cross-slope at ends of curb return to variable or parabolic section as required to match the existing street section. Transition shall be smooth and uniform between the points described above.

39-9.02 Material - Asphalt concrete shall conform to the provisions of Section 39 of the Caltrans Standard Specification. Unless otherwise specified, asphalt concrete shall be Type B.

For low or medium volume local streets, asphalt concrete for surface course paving shall be Type B, ½" maximum, coarse aggregate. Asphalt concrete shall have a viscosity grade of AR-4000 as specified by Caltrans Standard Specification Section 92. Asphalt concrete for base course paving for low or medium volume residential streets may be Type B, ½" maximum, coarse aggregate as specified above for surface course paving or as specified below for all other streets.

Unless otherwise specified or approved by the Engineer, asphalt concrete for base and surface course paving for all other streets shall be Type A, ¾" maximum, medium aggregate. Asphalt concrete shall have a viscosity grade of AR-8000 as specified by Caltrans Standard Specification Section 92.

For non-City projects, the precise asphalt binder content shall be in accordance with a mix design pre-approved by the City Engineer within six months of placement of the asphalt concrete. For City projects, the asphalt oil content shall be as specified in the project specification special provisions. Mix designs shall specify a target value for asphalt binder to be mixed with the aggregate in accordance with California Test No. 367 using proposed aggregate grading in conformance with Section 39-3.03.

Mix designs shall provide for a minimum stability value of 37 at the target asphalt binder value when measured in accordance with California Test No. 366. The minimum cohesiometer value of the fresh mix shall be 50, when measured in accordance with California Test No. 306. Mix designs shall provide not more than 5 percent and not less than 3 percent calculated air voids at the target value when measured in accordance with California Test No. 308A. The maximum swell for mix designs shall be 0.003 inches in 24 hours when measured in accordance with California Test No. 305. The minimum value of stability, after testing for Moisture Vapor Susceptibility (MVS) in accordance with California Test No. 307, shall be 30.

Cleaning and tacking for subsequent base courses will be required as stated in Section 39-9.01.

39-9.03 Placement and Compaction - The maximum compacted thickness of any one base course of asphalt concrete shall be six (6) inches. The maximum compacted thickness of the surface course (1/2"aggregate) of asphalt concrete shall be two and one-half (2.5) inches, and the minimum thickness shall be one (1) inch after compaction. Minimum compacted base course shall be four (4) inches.

A mechanical paving machine shall only be required for spreading the surface course and any leveling courses required.

In lieu of the conflicting provisions of Caltrans Standards Specifications Sections 39-5 and 39-6, asphalt concrete base courses may be spread and compacted by such mechanical means as will provide a surfacing of uniform smoothness and texture in such a manner as to prevent segregation of materials. Approval will be based on demonstrated performance of such equipment.

A prime coat of SC250 or MC250 shall be applied to all aggregate bases to be surfaced. The prime coat shall be applied at an rate of 0.2 gallon per square yard over the entire roadway area to be surfaced.

Rolling of Full Depth base courses shall be from the center of the paving pass to the edge.

The Contractor shall furnish a minimum of one (1) 10-ton steel wheel tandem roller (as specified in Caltrans Section 39-5.02) and one (1) 15-ton pneumatic tired roller.

Alternate compacting equipment or substitution of a vibratory roller for a pneumatic-tired roller will not be permitted, approved or reviewed.

Tire pressure of the pneumatic tire roller at the time of breakdown rolling shall be 90 psi unless a lesser tire pressure is permitted by the Engineer. It is suggested that the pneumatic tire roller have twenty (20) inch rims to help prevent bogging down. The pneumatic tire roller shall be used to break down the spread of asphalt concrete bases and shall operate immediately behind the paver or spreader.

All mixtures shall be spread at a temperature of not less than 250 degrees F. Base material compaction shall be completed before the mix reaches 200 degrees F.

Roller tires shall be preheated and operated hot and dry or have proper spray equipment for use of Roller-Ease to prevent pick up of hot mix.

All courses shall be compacted with a pneumatic roller. In truck routes, each course shall be pneumatic and steel rolled. Rolling shall continue until ruts are eliminated and the proper degree of compaction is achieved. Final rolling of the surface course shall be accomplished with a steel wheel tandem roller.

The surface of the completed base course at any point shall not vary more than 0.02 feet above or below the grade established for surface course placement.

The Contractor will be responsible for construction grades. The City will set a base line and furnish cuts for gutter flowlines and pavement centerline or edge of pavement grade. Base course surface prior to placement of surface course which does not meet the above requirements shall be planed or filled at the contractor's expense in a manner acceptable to the Engineer that will not damage the existing compacted base and will obtain the required material compaction at required temperature.

SECTION 63

CAST-IN-PLACE CONCRETE PIPE

63-1.05 Construction - Add the following:

The use of cast-in-place concrete pipe shall not be allowed in areas with ground water less than five feet below the pipe soffit.

SECTION 71

SANITARY SEWERS AND STORM SEWERS

NOTE: THIS SECTION IS ADDED IN ITS ENTIRETY TO THE BLANK SECTION IN THE CALTRANS STANDARD SPECIFICATIONS.

Unless specifically differentiated herein, references to Sanitary Sewers also references Storm Sewers (aka. Storm Drains).

71-1.01 Description - This work shall consist of laying sewer pipe and constructing sewer structures as shown on the Project Plans, in accordance with these Standard Specifications and Plans, the Special Provisions and as directed by the Engineer.

The type of sewer pipe and sewer structures will be designated in the contract items.

71-1.02 Materials - Pipe, fittings, miscellaneous materials and the most common joint materials are described in this Section 71-1.02.

Portland cement used in the production of concrete products set forth in this Section 71-1.02 shall be Type II Modified cement conforming to the provisions in Section 90, "Portland Cement Concrete."

71-1.02A Reinforced Concrete Pipe (RCP) - Reinforced concrete pipe shall conform to A.S.T.M. Designation C-76 for the size and classes indicated on the Project Plans. For sanitary sewer applications, RCP shall be used only on sewer lines 36-inch and larger.

71-1.02A(1) Plastic Lining – All RCP used in sanitary sewer applications shall be lined with plastic lining. The full three hundred and sixty degrees (360°) of the interior circumference of all reinforced concrete pipe to be used in Sanitary Sewer Systems shall be sealed and protected with a polyvinyl chloride resin lining. Copolymer resins will not be permitted.

The plastic liner shall be impermeable to sewage gases and liquids and shall be nonconductive to bacterial or fungus growth. The lining shall be impact resistant, flexible, and shall have an elongation sufficient to bridge up to 1/8" settling cracks which may take place in the pipe or in the joint after installation without damage to the lining.

The lining shall be of a type that is permanently and physically embedded into the concrete pipe wall by the T-lock mechanism and shall not rely on an adhesive bond between the lining and pipe wall.

The lining at all pipe joints, and at all joints between individual sheets or sections of lines shall be continuously heat welded by the use of welding strips of the same kind and equivalent thickness of the material as the lines.

The contract shall submit for the Engineer's consideration written information as to the type, size, workmanship and other specifications for the plastic liner the Engineer proposes to use on any installation. Approval of this submission by the Engineer shall be obtained prior to any material being delivered to the job site.

71-1.02B Clay Pipe - Vitrified clay pipe shall conform to the specifications for extra strength pipe of A.S.T.M. Designation C-700 and C-301.

71-1.02C Ductile Iron Pipe - Ductile iron pipe shall comply with ANSI A21.51 (AWWA C151).

71-1.02D Acrylonitrile-Butadiene-Styrene (ABS) Pipe (Sewer Pipe) – Pipe sizes four (4) inch and six (6) inch diameter shall conform to ASTM D2751-80 with minimum wall thickness determined by SDR 35.

Pipe sizes eight (8) through fifteen (15) inch diameter shall conform to ASTM D2680-80 with Type OR or Type SC joints.

71-1.02E Polyvinyl Chloride (PVC) Pipe - All solid wall pipe and fitting in 4" through 15" diameters shall be type PSM SDR-35 PVC, ASTM 3034; 18" through 24" shall be type PS 46 PVC, ASTM F679. Pipe and fittings shall be marked as per ASTM requirements.

Profile wall polyvinyl chloride pipe (PWPVC) may be used for pipe sizes 21-inch through 48-inch.

PWPVC shall be manufactured from a PVC compound having a minimum cell classification of 12364A as defined in ASTM D 1784. Gasket shall meet the requirements of ASTM F 477.

PWPVC shall be closed profile, ASTM F 1803-97 for 21" – 48" diameters with a bell and spigot gasketed joint. The joint shall meet the requirements of ASTM D 3212. The pipe shall have a minimum pipe stiffness when tested in accordance with ASTM D 2412.

Tests for compliance with this specification shall be made according to the applicable ASTM Specifications at the time of manufacturing. The manufacturer shall provide a certificate of compliance with this specification. In addition, the CITY may, at his own expense, station a representative or third party inspector at the site of manufacture to continuously monitor the manufacturing process, and to independently test the pipe to verify conformance with the project specification. Pipe tests and frequency shall be determined by the City.

PWPVC Nominal Dimensions:

Nominal Diameter (in.)	Outside Diameter (in.)	Inside Diameter (in.)
21	22.110	20.75
24	25.040	23.50
27	28.232	26.50
30	31.430	29.50
36	37.800	35.50
42	44.200	41.50
48	50.57	47.50

Unless otherwise approved by the CITY, all pipe shall be unloaded in the original packaging using a forklift with fork arms long enough to reach beyond the last pipe bundle. Do not roll the pipe off of the truck. Pipe shall not be handled or secured using chains or cables; a nylon or textile strap is recommended.

In addition to the requirements reflected in Section 71-1.05 Pipe Laying, the pipe bedding shall be carefully placed and compacted in the haunching. The haunching area extends from the bottom of the pipe to the springline of the pipe. Bedding shall be placed in 6" loose lifts on alternate sides of the pipe. A Tamping bar or shovel shall be used to facilitate bedding consolidation on the lower quadrant of the pipe. The bedding shall be mechanically compacted using hand operated equipment in accordance with the manufacturer's recommendations. The bedding material and its proper placement are the most important factors affecting the performance (side support) of the pipe.

Initial Backfill shall be placed to protect the pipe from dropping of large rocks, large mechanical compaction equipment or other impact loads that may occur during final backfill.

Pipe Deflection Testing: Pipe testing shall be performed in accordance with Section 71-1.11B.

71-1.02F Miscellaneous Iron and Steel - Miscellaneous iron and steel items shall conform to the provisions in Section 75, "Miscellaneous Metal."

71-1.02G Reinforcement - Reinforcement shall conform to the provisions in Section 52, "Reinforcement."

71-1.02H Concrete - Concrete shall conform to the provisions in Section 51, "Concrete Structures," and Section 90, "Portland Cement Concrete."

71-1.02I High Density Polyethylene Pipe (HDPE) - HDPE pipe and fittings shall be made of high density, high molecular weight, Type III, Class C, Category 5, Grade P34 polyethylene meeting the requirements of ASTM D1248 and ASTM F894 unless specified otherwise herein. Wall configurations and thicknesses shall meet the deflection requirements of this section. Crushing and buckling strengths shall exceed that required from the loads anticipated. Pipe selection and deflection design shall also be based upon a pipe stiffness not less than 20 psi and a modulus of soil reaction no greater than 1400. Pipe stiffness shall be tested prior to installation in accordance with ASTM D2412 with a 5% deflection at a rate of 1/2 inches per minute.

71-1.03 Excavation and Backfill - Excavation and backfill shall conform to the provisions shown on City of Stockton Standard Plans No. 50 and 51.

The pipe shall be laid in a trench excavated to the lines and grades designated by the Engineer. The bottom of the trench shall be graded and prepared to provide a firm and uniform bearing throughout the entire length of the pipe barrel.

Suitable excavation shall be made to receive the bell of the pipe and the joint shall not bear upon the bottom of the trench. All adjustment to line and grade shall be made by scraping away or filling in with sand, gravel, or granular material under the body of the pipe, and not by wedging or blocking.

Trenches shall not be left open farther than 100 feet in advance of pipe laying operations or 100 feet to the rear thereof.

The excavation shall be supported so that it will be safe and that the ground alongside the excavation will not slide or settle and all existing improvements, either on public or private property, will be fully protected from damage.

All supports shall be removed after construction is completed and shall be withdrawn in a manner that will prevent the caving of the sides of the excavation. All openings caused by the removal of supports shall be filled with suitable material properly compacted.

71-1.04 Bedding - Bedding shall be defined as that material supporting, surrounding and extending to one foot above the top of the pipe. Where it becomes necessary to remove boulders or other interfering objects at subgrade for bedding, any void below such subgrade shall be filled with the bedding material designated on the Project Plans. Where concrete is specified to cover the pipe, the top of the concrete shall be considered as the top of the bedding.

If soft, spongy, unstable, or other similar material is encountered upon which the bedding material or pipe is to be placed, this unsuitable material shall be removed to the depth specified by the Engineer and replaced with bedding material suitably densified.

Bedding material shall first be placed so that the pipe is supported for the full length of the barrel with full bearing on the bottom segment of the pipe equal to a minimum of 0.5 times the outside diameter of the barrel. Densification of bedding for pipe shall be accomplished after the sheeting or shoring has been removed from the bedding zone. Alternate methods of pipe laying which are recommended by the pipe manufacturer may be used if reviewed by the Engineer. The bedding zone for PVC, ABS, and HDPE pipe shall be mechanically compacted before the remainder of trench is compacted.

Bedding material shall be sand, gravel, crushed aggregate, native free-draining granular material having a sand equivalent of not less than 20 as specified on Standard Plans Nos. 50 and 51 for trench backfilling.

Pea gravel is not acceptable. No aggregate shall exceed 1".

In cases where native material is suitable for use as bedding, the trench may be excavated to point above the invert grade and the trench bottom hand-shaped so that the bottom segment of the pipe is firmly supported on undisturbed material.

Bedding material for HDPE pipe shall be 3/4" crushed rock. The portion of the material that is larger than will pass a 3/8" sieve shall contain at least 50% of particles having three or more fractured faces. Not over 5% shall be pieces that show no such faces resulting from crushing. The gradation of the crushed rock shall be as follows:

Sieve Size	**¾"**
1 ½"	-
1 "	100
¾ "	90-100
½ "	30-60
3/8"	0-20
No. 4	0-5
No. 8	-

This material shall be compacted to the density and level shown on Drawing 51-A.

71-1.05 Pipe Laying - Pipe shall be protected during handling against impact shocks and free fall. Pipe will be carefully inspected in the field before and after laying. If any cause for rejection is discovered in a pipe after it has been laid, it shall be subject to rejection. Any corrective work shall be reviewed by the Engineer and shall be at no cost to the City.

When connections are to be made to any existing pipe, conduit, or other appurtenances, the actual elevation or position of which cannot be determined without excavation, the Contractor shall excavate for, and expose, the existing pipe improvement before laying any pipe or conduit. The Engineer shall be given the opportunity to inspect the existing pipe or

conduit before connection is made. When the new facilities interfere with the existing flow of sewage, the Contractor shall provide satisfactory bypass facilities at the Contractor's expense.

The pipe shall be laid without break upgrade from structure to structure, with bell end upgrade, unless otherwise permitted by the Engineer.

All joints shall be cleaned and then sealed with the type of materials specified or required by the City. In the absence of such requirements the pipe shall be jointed with materials recommended by the pipe manufacturer for the purpose intended, and reviewed by the Engineer, in order to obtain a watertight joint against leakage and infiltration under all conditions of expansion, contraction, and settlement.

Whenever the work ceases for any reason, the end of the pipe shall be securely closed with a tight fitting plug or cover.

Whenever existing pipes are to be cut or abandoned, the open ends of said pipes shall be securely closed by a tight fitting plug or wall of concrete not less than 0.5 foot thick, or by a tight brick wall 0.67 foot thick with cement mortar joints.

Where ground water occurs, the bottom of the trench shall be kept entirely free of water during the pipe laying, filling the joints, and as long thereafter as directed by the Engineer.

All joints shall be carefully cleaned on the inside.

Stoppers for pipes and branches left unconnected shall be made of the same material as the pipe or of resilient joint material conforming to Section 71-1.02J, "Resilient Joint Material." After placing the stopper, it shall be covered with a layer of sealant. The sealant shall be sufficiently fluid to insure free flow around the stopper.

Concrete pipe with elliptical reinforcement shall be laid with the minor axis of the reinforcement cage in a vertical position.

Pipe shall be laid true to line and grade. Any pipe, which is not in true alignment or shows any undue settlement after lying shall be taken up and re-laid at the Contractor's expense.

Pipe sections shall be laid and joined in such a manner that the offset of the inside of the pipe at any joint will be held to a minimum at the invert. The maximum offset at the invert of pipe shall be 1 percent of the inside diameter of the pipe or 3/8 inch (9.5 mm), whichever is smaller.

In joining socket and spigot pipe, the spigot of each pipe shall be so seated in the socket of the adjacent pipe as to give a minimum of 3/8 inch (9.5 mm) annular space all around the

pipe in the socket. Unavoidable offsets shall be distributed around the circumference of the pipe in such a manner that the minimum offset occurs at the invert.

Pipe shall be laid true to line and grade. Any pipe which deviates from the engineering alignment by ½" or grade by ¼" or results in a reverse slope or shows any undue settlement after laying shall be taken up and re-laid.

After the joints have been made, the pipe shall not be disturbed in any manner.

During installation, linear expansion and contraction shall be kept below the manufacturer's recommendations. Strutting shall be mandatory for size 36" and larger. A strutting detail shall be reviewed by the City Engineer prior to installation. Pre-deflecting the pipe shall only be permitted subsequent to approval from the City Engineer.

71-1.06 Pipe Joints

71-1.06A Vitrified Clay Pipe - Either polyvinyl chloride or polyurethane compression joints may be used. Materials shall conform to A.S.T.M. Designation C-425.

Joints shall contain two sealing components, one bonded to the outside of the spigot and the other bonded to the inside of the socket. Sealing components shall be a plasticized polyvinyl chloride compound or polyurethane elastomer bonded to pipes and fittings at the pipe factory, and shall be cured to a uniform hardness and compressibility. The sealing components shall be shaped, sized, bonded, and cured in such a manner as to form a tight, dense, and homogenous compression coupling when the joint is assembled. Any imperfection in the sealing components will be cause for rejection.

Upon installation, the meeting surfaces shall be wiped clean of dirt and foreign matter, then an approved lubricant shall be applied to the joint surfaces. The spigot shall be positioned inside the socket and the joint shoved home. For large diameter pipe, a lever attachment or bar cushioned with a wooden block shall be used to shove the joint into place.

In no case shall a bar be used on an unprotected joint surface. Mating surfaces shall be in tight contact with each other upon completion of the joint installation.

Polyvinyl chloride joints may be used on curves, provided that the radius of curvature is not less than shown in the following table, unless beveled pipe or shorter lengths are provided:

Pipe Size Inches	Maximum Pipe Length Feet	Minimum Radius of Curvature Feet	Maximum Deflection
6	5	100	2° 00'
8	5	100	2° 00'
8	6	115	2° 00'
10	5	185	1° 33'
10	6	220	1° 33'
12	5	215	1° 20'
12	6	260	1° 20'
15	5	275	1° 03'
15	6	330	1° 03'

Polyurethane joints may be permitted for use on curves, provided that the radius of curvature is not less than shown in the following table, unless beveled pipe or shorter lengths are provided.

Pipe Size Inches	Maximum Pipe Length Feet	Minimum Radius of Curvature Feet	Maximum Deflection
6	5	100	2° 00'
8	5	100	2° 00'
8	6	115	2° 00'
10	5	170	1° 41'
10	6	205	1° 41'
12	5	150	1° 54'
12	6	180	1° 54'
15	5	190	1° 32'
15	6	225	1° 32'
18	5	225	1° 16'
18	6	275	1° 16'
21	5	265	1° 06'
21	6	315	1° 06'
24	5	240	1° 12'
24	6	290	1° 12'
27	5	270	1° 04'
27	6	325	1° 04'
30	5	300	0° 58'
30	6	360	0° 58'
33	5	275	1° 03'
33	6	330	1° 03'
36	5	295	0° 59'
36	6	355	0° 59'
39	5	325	0° 54'
39	6	385	0° 54'
42	5	345	0° 50'
42	6	415	0° 50'

71-1.06B Reinforced Concrete Pipe. All reinforced concrete sanitary sewer pipe shall be joined with rubber gasket joints.

Rubber gasket joints shall conform to the requirements of A.S.T.M. Designation: C443 and shall be flexible and able to withstand expansion, contraction and settlement.

All rubber gaskets shall be stored in as cool a place as practicable, preferably at 70° or less, and in no case shall the rubber gaskets be exposed to the direct rays of the sun for more than 72 hours.

Rubber gaskets, of the type requiring lubrication, shall be lubricated with the lubricant recommended and supplied by the manufacturer of the pipe.

The ends of the pipe shall be so formed that when the pipes are laid together and joined, they shall make a continuous and uniform line of pipe with a smooth and regular surface.

Joints shall be water-tight and flexible. Each joint shall contain a solid gasket of rubber or other material approved by the Engineer, which shall be the sole element responsible for water-tightness of the joint. This gasket shall be of circular cross section unless otherwise approved by the Engineer. The length and cross sectional diameter of the gasket, the annular space provided for the gasket, and all other joint details shall be such as to produce a water-tight joint. The slope of the longitudinal gasket contact surfaces of the joint with respect to the longitudinal axis of the pipe shall not exceed 2°.

Under ordinary laying conditions, the work shall be scheduled so that the socket end of the pipe faces in the direction of laying. Prior to placing the spigot into the socket of the pipe previously laid, the spigot groove, the gasket and the inside of the socket shall be thoroughly cleaned. Then the spigot groove, the gasket and the first 2 inches (50.8 mm) of the inside surface of the socket shall be lubricated with a soft vegetable soap compound.

The gasket shall be uniformly stretched when placing it on the spigot so that the gasket is distributed evenly around the circumference. The gasket shall be lubricated as per manufacturer's recommendations.

For pipe in which the inside joints are to be pointed, suitable spacers shall be placed against the inside shoulder of the socket to provide the proper space between abutting ends of the pipe.

After the joint is assembled, a thin metal feeler gage shall be inserted between the socket and the spigot and the positions of the gasket checked around the complete circumference of the pipe. If the gasket is not in the proper positions, the pipe shall be withdrawn, the gasket checked to see that it is not cut or damaged, the pipe relaid, and the gasket position again checked.

71-1.06C Ductile Iron Pipe. Ductile iron pipe joints shall comply with the following requirements:

Type of Joint	Specification
Rubber Gasket Push-On Joint	ANSI A21.11 (AWWA C111)
Mechanical Joint	ANSI A21.11 (AWWA C111)
Flanged Joint (AWWA C110)	ANSI B16.1, B.16.2, and A21.10
Flanged Joint (Threaded Flanges)	ANSI B2.1

All rubber gasket, push-on, mechanical and flanged joint fittings for ductile iron pipe shall be manufactured in accordance with ANSI A21.10 (AWWA C110).

Slip-On Joint - The gasket and gasket seal inside the socket shall be wiped clean before the gasket is inserted. A thin film of soft vegetable soap compound shall be applied to the gasket and the outside of the spigot end of the pipe. The spigot shall then be positioned inside the socket and shoved home. Lubricant other than that furnished with the pipe shall not be used.

Mechanical Joints - The outside of the spigot and the inside of the socket shall be thoroughly cleaned of foreign matter. The gland and gasket shall then be slipped onto the spigot end of the pipe. The gasket shall be pressed evenly into the socket only after the spigot is seated in the socket. The gland shall be brought up evenly by tightening alternately the nuts spaced 180° apart. Bolts and nuts shall be coated with mastic following tightening.

Flanged Joints - Flanged Joints shall be firmly and fully bolted with machine bolts of proper size. Full circle reinforced neoprene rubber gaskets 1/16" thick shall be used at all flanged joints. Bolts and nuts shall be coated with mastic following tightening.

71-1.06D ABS Sewer Pipe

1. Pipe lengths and fittings shall be joined by utilizing elastomeric gaskets as referenced in A.S.T.M. D-2680 and D-2751 and meeting the requirements of A.S.T.M. D-3212 "Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals," or solvent weld joints.

   Solvent weld joint or usage shall conform to A.S.T.M. F-402 "Safe Handling of Solvent Cements and Primers Used for Joining Thermoplastic Pipe and Fittings," and the following requirements:

a. All ABS pipe joints, fittings and surfaces to be joined by solvent welding shall be connected with adhesive cement conforming to A.S.T.M. D2680 for ABS composite sewer pipe or to A.S.T.M. D2751 for 4-inch and 6-inch ABS solid wall pipe.

b. Prior to joining ABS pipe joints, fittings and surfaces, dirt, mud or any other foreign material shall be thoroughly removed and cleaned from the joints, fittings and surfaces to be joined.

c. A coat of adhesive cement shall be liberally and thoroughly applied to the joints, fittings and surfaces to be joined. After application of the adhesive cement, the pipe joints, fittings, and surfaces to be joined shall be immediately fitted and joined without interruption.

For bell and spigot connections, the spigot end of each pipe shall be fitted to the full depth of the bell socket.

d. When the temperature is below 40° F., a primer shall be applied to the pipe surface to be cemented and joined.

2. Reducing Wyes:

a. Reducing wyes for service laterals shall be either saddle type wyes or in-line bell and spigot type wye fittings. All reducing wyes shall be premoulded and factory fabricated.

b. Saddle Fittings:

1. In addition to the solvent welding of the saddle to the main pipeline, the saddle type wye shall be attached to the main pipeline with a stainless steel clamp.

2. Tapping hole for saddle fittings shall be cut with a cutting instrument. The hole shall be of the same size and shape of the lateral pipe surface.

3. Exposed Pipe Cross-Sections:

Exposed cross-sections of the ABS composite sewer pipe shall be coated with adhesive cement prior to connection of pipe joints, fittings and surfaces.

4. Maintenance Hole Connections:

Maintenance hole connections shall be by rubber ring water stop installed on pipe and cast in center of maintenance hole wall or four (4) inches from outside face of maintenance hole base. Pipe section on water stop at maintenance hole shall have bell flush with outside of maintenance hole or no more than ten (10) inches outside maintenance hole.

71-1.06E PVC Pipe

1. All joints shall be integral wall bell and spigot configuration, factory formed in accordance with ASTM D3212. All rubber rings shall conform to A.S.T.M. F-477.

2. Reducing wyes for service laterals shall be in line bell and spigot type, factory moulded.

3. Saddle fittings for lateral connection will be permitted; solvent welded.

4. Maintenance hole connections shall be by rubber ring water stop installed on pipe and cast in center of maintenance hole wall or four (4) inches from outside face of maintenance hole base. Pipe section on water stop at maintenance hole shall have bell flush with outside of maintenance hole or no more than ten (10) inches outside maintenance hole.

71-1.06F HDPE Pipe

Joints for HDPE shall be bell and spigot or butt-fusion type. Bell and spigot types shall have an elastomeric gasket which will be compressed radially to form a watertight seal. The joint shall be designed to avoid displacement of the gasket when installed with the manufacturer's recommendations.

71-1.07 Deformation Testing - Following the placement and compaction of backfill and prior to placement of permanent pavement, the Contractors shall perform a deflection test on the pipe. If the pipe should fail the deflection test, the Contractor shall uncover the pipe and make adjustments in the bedding and/or backfill conditions that will be necessary to achieve a passing test. The trench shall be backfilled and street subgrade shall be recompacted and the pipe retested. Any corrective measures found necessary to meet the deflection requirements, including recompaction and regrading of the street subgrade, shall be included in the unit price bid for the sanitary sewer pipe.

See Section 71-1.11 for method and extent required.

a. Maximum deflection for ABS composite sewer pipe installed is 4%.

71-1.08 Existing Maintenance Holes - Existing maintenance holes shall be adjusted to grade, remodeled or abandoned as shown on the Project Plans and in accordance with the provisions in Section 15, "Existing Highway Facilities."

When designated on the Project Plans, or directed by the Engineer, existing maintenance hole frames and covers shall be reset on new structures. Upon completion of the adjustment of existing maintenance holes to grade, the maintenance hole cover shall conform to the planned surface as specified for the finished asphalt concrete surface, Section 39.

All existing maintenance holes, lampholes and terminal cleanout frames and covers that are removed become the property of the City of Stockton.

71-1.09 Sewer Structures - New maintenance holes, lampholes, terminal cleanout structures, and pipe chimneys for sewers shall be constructed in accordance with the details shown on the Standard Plans, as specified in this Section 71-1.09 and as directed by the Engineer.

Precast maintenance hole, pipe maintenance holes shall conform to the Standard Plans, the Project Plans, and the applicable sections in Section 70.

Maintenance hole frames shall be secured to the maintenance hole cover and riser barrels with full mortar bed or full circle concrete collar that will effectively secure the frame to the maintenance hole structure and provide a uniform bearing for the frame.

Concrete for sewer structures shall be Class A as described in Section 90-1.01. Concrete for sewer maintenance bases shall be Class B.

When the maintenance hole is located in the pavement area, it shall not be constructed to final grade until pavement has been completed.

Where new work is jointed to the surface of unfinished work, the latter shall be thoroughly cleaned.

All joints on the inside of structures and sewers shall be neatly struck and pointed where plastering is not specified on the plans.

The inside bottoms of existing maintenance holes, where new connections are made, and of new maintenance holes shall be shaped to provide channels conforming to the size and shape of the lower portion of the inlets and outlets of the maintenance holes. The channels shall vary uniformly in size and shape from inlet to outlet.

No pipe shall project more than 0.17 foot into a maintenance hole and in no case shall the bell of a pipe be built into the wall of a maintenance hole or structure.

All concrete shall be cured for a period of not less than 10 days after being placed and shall be protected from damage.

71-1.09A Maintenance Hole Interior Linings and Coatings

General - The interior of all new maintenance holes along sanitary sewer lines 24" and larger, which will be maintained by the City, shall be either lined or coated. In addition, the interior of any existing City Maintenance hole(s), downstream from a new Sanitary Sewer system, determined by the City Engineer, to be adversely affected by the additional sewage, shall be either lined or coated.

Material - If lined, the material shall be made of polyvinyl chloride and conform to the requirements as set forth in Section 71-1.02A(1).

If coated, the coating shall be resistant to attack from the following: bleaches; sulfuric, acetic, hydrochloric, phosphoric, nitric, chromic, oleic, and stearic acids; sodium and calcium hydroxides; ammonium, sodium, calcium, magnesium, and ferric chlorides; ferric sulfate, hydrogen sulfides, petroleum oils and greases, vegetable and animal oils, fats, greases, soaps and detergents. The coating shall be impermeable to sewage gases and liquids and shall be non-conducive to bacterial or fungus growth.

Acceptable coatings are as follows:

PRODUCT NAME	PRODUCT TYPE	MANUFACTURER
120 Vinester	Vinylester Mortar	Tnemic Company, Inc.
Chesterton 798	Epoxy Mortar	A.W. Chesterton Company
Concresive 1305	Epoxy	Adhesive Engineering Company
Hydro-pox	Epoxy	Con-Tech
I.E.T. System 3	Polyester Mortar	Integrated Environmental Technologies
I.P.I. Crystal Quartz	Epoxy Mortar	Integrated Polymer Industries, Inc.
Lining No. 210	Epoxy	Sauereisen Cements
Maga Quartz	Epoxy Mortar	Belzona Molecular, Inc.
Mainstay DS-4	Epoxy Mortar	Mainstay Corporation
Quantum	Polyester Mortar	Polymorphic Polymer's Corporation
Semstone 140S	Epoxy Mortar	Sentry Polymers

The City Engineer, at the City Engineer's discretion may , at any time, determine that a product is not suitable for specific applications. Additionally, this list may be reviewed annually by the Materials Review Committee and products may be determined not suitable for specific applications.

Surface Preparation - For coatings, it is the intent of this standard that the application surface be clean and dry. Surfaces shall be cleaned to achieve an ASTM D-4259 Standard by abrasive blast cleaning methods. All surfaces shall be cleaned to remove all dirt, dust, corrosion products, loose concrete, debris, grease, oils, growths and foreign matter. On new concrete and metal surfaces, a sandblasting shall be used to remove all laitance. Coatings shall be applied only to a sound clean surface profile consistent with the manufacturer's published recommendation.

New concrete shall be aged no less than 30 days prior to application.

Cracks, joints, eroded and damaged areas shall be sealed with a compatible grout/putty as recommended by the coating manufacturer prior to the application of the coating material.

Application - All coating materials shall be applied in a manner and thickness consistent with the manufacturer's published recommendation.

All coatings shall be applied in a manner consistent with all applicable environmental and health and safety regulations. At a minimum, during application, the applicators shall use protective clothing, eye protection, chemical resistant gloves, and air respirators.

The coating shall be free of blisters, pinholes, holidays, or discontinuities.

Inspection - All coating work shall be performed in the presence of the designated City construction inspector. All coating work done in the absence of the inspector is subject to rejection unless specifically allowed by the inspector. The inspector shall be provided access to the construction site and to those areas subject to the performance of work under this standard.

Testing - All testing shall be performed by the contractor in the presence of a City inspector. All lining and coating work shall be high-voltage spark tested at a minimum 125 volts per mil film thickness of coating. Contractor shall verify to the City that the test equipment is in proper working condition prior to spark testing. Use Tinker-Rasor AP-W test equipment or approved equal.

Repairs of Holidays or Pinholes - All areas to be repaired, as determined by inspection and testing, shall be repaired in accordance with the product manufacturer's recommendations.

71-1.10 Trench Resurfacing - Trenches in existing streets, except streets which are to be closed or abandoned, shall be resurfaced with the type and thickness of bases, surfacing or pavement, as shown in these Standard Specifications and Plans. The Contractor shall proceed immediately to resurface any part of any excavation upon notice from the Engineer without

waiting for completion of the full length of the sewer. All trenches shall be backfilled or covered at the end of each working day. Any temporary trench patching shall be approved by the City Engineer.

71-1.11 Testing:

71-1.11A Cleaning - Prior to performing tests, the pipe installation shall be thoroughly cleaned. Cleaning shall be performed by the Contractor by means of an inflatable rubber ball. The ball shall be of a size that will inflate to fit snugly into the pipe to be tested. The ball shall be controlled with a tag line. The ball shall be placed in the last lamphole or maintenance hole on the pipe to be cleaned, and water shall be introduced behind it. The ball shall pass through the pipe with only the pressure of the water impelling it. All debris flushed out ahead of the ball shall be removed at the first maintenance hole where its presence is noted. In the event cement or wedged debris or a damaged pipe shall stop the ball, the Contractor shall remove the obstruction.

71-1.11B Deflection Test for ABS, PVC, (Solid Wall and Profile Wall), and HDPE Sanitary Sewer Pipe – A short-term deflection test shall be conducted no sooner than 30 days after the placement and densification of backfill. The Contractor shall furnish all equipment needed to complete this test. The cost for the deflection test shall be included in the unit price bid for the sanitary sewer pipe.

For PVC pipe, the allowable short-term deflection shall be 5%. The minimum allowable I.D. (O.D. of the mandrel) shall be established by the pipe manufacturer.

For ABS Pipe - All mainline pipe shall be cleaned and then mandrelled to measure for obstructions (deflection, joint offsets, lateral intrusions, etc.). A rigid mandrel with a circular cross-section having a diameter at least 96% of the specified average inside diameter shall be pulled through the pipe. The method of measuring the deflection shall be reviewed by the City Engineer. Any pipe through which the mandrel will not pass shall be said to have failed and will be repaired by the Contractor at the Contractor's expense.

For HDPE pipe--maximum long term deflection for HDPE pipe shall be no more than 5%. Long-term deflection shall be calculated as the short-term deflection multiplied by a deflection lag factor based upon the average inside diameter of the pipe. In no case shall a deflection lag factor of less than 1.5 be accepted. Mandrel deflection tests may be required during installation as specified by the City Engineer. Mandrels used in testing shall have an odd number of legs totaling no less than nine. Pipe sections not meeting the deflection requirements shall be excavated, re-installed, and subject to an additional 30-day deflection test.

At the Engineer's option, the Engineer may require a sample of ten percent (10%) of the laterals randomly selected by the inspectors shall also be tested for deflection. If difficulty is

encountered in passing the mandrel test, the inspector may direct that a larger sample of laterals be tested up to and including one-hundred percent (100%) of all laterals.

The Contractor shall furnish properly sized mandrels for size and type of pipe installed. Certification of proper mandrel size shall be required and mandrel identified in a manner to identify with certification.

At the Contractor's expense, all locations with deflection greater than allowable shall be excavated, repaired or replaced, backfilled and retested.

71-1.11C General - All leakage tests shall be completed and approved following the placement and densification of the back fill, but prior to placing of permanent surfacing.

When leakage or infiltration exceeds the amount allowed by the specifications, the Contractor at its expense shall locate the leaks and make the necessary repairs or replacements in accordance with the specifications to reduce the leakage or infiltration to the specified limits. Any individually detectable leaks shall be repaired, regardless of the results of the tests. Leakage tests shall be made on completed pipelines as follows:

1. Gravity Sanitary Sewer (24 inches (610 mm) or less in diameter where difference in elevation between inverts of adjacent maintenance holes is 10 feet (3.05 M) or less) - Water exfiltration test or water infiltration test as directed. The Engineer may allow substitution of an air pressure test for the water exfiltration test.

2. Gravity Sanitary Sewers (24 inches (610 mm) or less in diameter where difference in elevation between inverts of adjacent maintenance holes is greater than 10 feet (3.05 M) - Air pressure test.

3. Gravity Sanitary Sewers (greater than 24" (610 mm) in diameter) - Air pressure test or water infiltration test as directed.

4. Pressure Sewers (force mains) - Water pressure test at 50 psi (345 kPa) over pipe pressure classification or designation.

71-1.11D Water Exfiltration Test - Each section of sewer shall be tested between successive maintenance holes by closing the lower end of the sewer to be tested and the inlet sewer of the upper maintenance hole with stoppers. The pipe and maintenance hole shall be filled with water to a point 4 feet (1.22 M) above the invert of the sewer at the center of the upper maintenance hole; or if ground water is present, 4 feet (1.22 M) above the average adjacent ground water level.

The allowable leakage will be computed by the formulae:

$E = 0.0001\ LD\ \sqrt{H}$ for mortared joints.

$E = 0.00002\ LD\ \sqrt{H}$ for all other joints.

where:

L is the length of sewer and house connections tested, in feet.

E is the allowable leakage in gallon per minute of sewer tested.

D is the internal diameter of the pipe in inches.

H is the difference in elevation between the water surface in the upper maintenance hole and the invert of the pipe at the lower maintenance hole; or if ground water is present above the invert of the pipe in the lower maintenance hole, the difference in elevation between the water surface in the upper maintenance hole and the ground water at the lower maintenance hole.

However, the maximum shall not exceed 200 gallons per inch of internal diameter per mile per day.

The Contractor shall, at its expense, furnish all water, materials and labor for making the required test. All tests shall be made in the presence of the Engineer.

71-1.11E Water Infiltration Test - If, in the opinion of the Engineer, ground water is encountered in the construction of a section of the sewer, the Engineer may require the pipe be tested by the Water Infiltration Test as follows:

The end of the sewer at the upper structure shall be closed sufficiently to prevent the entrance of water, and pumping of ground water shall be discontinued for at least 3 days, or until the ground water has recovered its normal status level, after which the section shall be tested for infiltration.

The infiltration into each individual reach of sewer between adjoining maintenance holes shall not exceed that allowed by the formula in Section 71-1.11D where H is the difference in the elevation between the ground water surface and the invert of the sewer at the downstream maintenance hole.

Unless otherwise specified, infiltration will be measured by the Engineer using measuring devices furnished by the City.

All visible leaks shall be repaired by the Contractor regardless of volume involved.

71-1.11F Air Pressure Test - The Contractor shall furnish all materials, equipment and labor for making an air test. Air test equipment shall be approved by the City prior to the beginning of the test.

Each section of sewer shall be tested between successive maintenance holes by plugging and bracing all openings in the main sewer line and the upper ends of all sewer connections. Prior to any air pressure testing, all pipe plugs shall be checked with a soap solution to detect any air leakage. If any leaks are found, the air pressure shall be released, the leaks eliminated, and the test procedure started over again.

The final leakage test of the sewer main line and branching sewer connections, shall be conducted in the presence of the Engineer in the following manner:

1. Clean pipe to be tested by propelling snug fitting inflated rubber ball through the pipe with water.

2. Plug all pipe outlets with suitable test plugs. Brace each plug securely.

3. If the pipe to be tested is submerged in ground water, insert a pipe probe by boring or jetting, into the backfill material adjacent to the center of the pipe, and determine the pressure in the probe when air passes slowly through it. This is the back pressure due to ground water submergence over the end of the probe. All gauge pressures in the test should be increased by this amount.

4. Add air slowly to the portion of the pipe installation under test until the internal air pressure is raised to 4.0 psig.

5. After an internal pressure of 4.0 psig is obtained, allow at least two minutes for air temperature to stabilized, adding only the amount of air required to maintain pressure.

6. When pressure decreases to 3.5 psig, start stop watch.

6a. The following applies to all pipes other than PVC and ABS (see 6b):

Determine the time in seconds that is required for the internal air pressure to reach 2.5 psig. Minimum permissible pressure holding times are indicated by the following formula and table in seconds:

$$t = k\left(\frac{d}{g}\right)$$

where t = minimum required time in seconds
k = constant 0.022

d = nominal pipe diameter in inches
g = allowable air loss rate per unit
area, 0.003 cu. ft./min./sq. ft.
of internal/surface area

psig = pounds per square inch gage

MINIMUM HOLDING TIME IN SECONDS REQUIRED FOR PRESSURE TO DROP FROM 3 ½ TO 2 ½ PSIG

PIPE DIAMETER

LENGTH OF LINE IN FEET	4"	6"	8"	10"	12"	15"	18"	21"	24"	27"	30"	33"	36"	39"
25	4	10	18	28	40	62	89	121	158	200	248	299	356	418
50	9	20	35	55	79	124	178	243	317	401	495	599	713	837
75	13	30	53	83	119	186	267	364	475	601	743	898	1020	1105
100	18	40	70	110	158	248	256	485	634	765	851	935		
125	22	50	88	138	198	309	446	595	680					
150	26	59	106	165	238	371	510							
175	31	69	123	193	277	425								
200	35	79	141	220	317									
225	40	89	158	248	340									
250	44	99	176	275										
275	48	109	194	283										
300	53	119	211											
350	62	139	227											
400	70	158												
450	79	170												
500	88													
550	97													
600	106													
650	113	170	227	283	340	425	510	595	680	765	851	935	1020	1105

NOTES: (1) TO BE USED WHEN TESTING ONE DIAMETER ONLY
(2) The above air pressure test procedure is based on ASTM C828. Any special situations or conditions shall conform to this ASTM Standard.

6b. For PVC and ABS lines the following table lists the minimum times allowed for a pressure drop from 3.5 psi to 3.0 psi in excess of the ground water pressure at the top of the pipe.

Pipe Dia (in)	Min Time (min sec)	Lgth for Min Time (ft)	Time for Lngr Lgth (sec)	Specification Time for Length (L) shown (min:sec)							
4	1:53		.190L	1:53	1:53	1:53	1:53	1:53	1:53	1:53	1:53
6	2:50		.427L	2:50	2:50	2:50	2:50	2:50	2:50	2:51	3:12
8	3:47		.760L	3:47	3:47	3:47	3:47	3:48	4:26	5:04	5:42
10	4:43		1.187L	4:43	4:43	4:43	4:57	5:56	6:55	7:54	8:54
12	5:40		1.709L	5:40	5:40	5:42	7:08	8:33	9:58	11:24	12:50
15	7:05		2.671L	7:05	7:05	8:54	11:08	13:21	15:35	17:48	20.02

SAFETY NOTE:

The air test may be dangerous if, because of ignorance or carelessness, a line is improperly prepared. It is extremely important that the various plugs be installed and braced in such a way as to prevent blowouts. Inasmuch as a force of 250 lbs. is exerted on an 8" plug by an internal pipe pressure of 5 psi, it should be realized that sudden expulsion of a poorly installed plug or of a plug that is partially deflated before the pipe pressure is released can be dangerous.

As a safety precaution, pressurizing equipment should include a regulator set at perhaps 10 psi to avoid over-pressurizing and damaging an otherwise acceptable line. No one shall be allowed in the maintenance holes during testing.

IF THE TIME LAPSE IS LESS THAN THAT SHOWN IN THE TABLE, THE CONTRACTOR SHALL MAKE THE NECESSARY CORRECTIONS TO REDUCE THE LEAKAGE TO ACCEPTABLE LIMITS.

71-1.11G Televising of Sanitary Sewers - Following the placement and compaction of backfill and completion of other required testing, but prior to the placing of pavement, the Contractor shall televise all sewer lines for conformance to the Project Plans and specifications. A tape and log of the televising shall be delivered to the Engineer within a week of televising. If defective pipes or conditions are discovered they shall be corrected at no cost to the City. Any corrective work proposed shall be approved by the Engineer.

The City may also televise sewer lines prior to the expiration of the one year warranty. If a defective condition is found, it shall be presumed to be caused by defective workmanship or

materials. The developer and/or Contractor shall be notified and shall correct the work in a manner approved by the Engineer.

71-1.12 Measurement - Sewer work performed under Section 71, "Sewers," will be designated in the contract item by size, type, thickness, quality, or whatever information is necessary for identification.

The lengths of the various types of sewer pipe to be paid for by the linear foot; measured from centerline of maintenance hole to center line of maintenance hole between structures or to end of line not terminated at a structure.

Pipe bends, wyes, tees and other branches will be measured by the linear foot for the sizes of pipes involved. Bends will be measured along centerlines. Wyes, tees, and other branches will be measured along centerlines to the point of intersections.

Quantities of precast concrete pipe sewer maintenance holes, lampholes, terminal cleanout structures, and pipe chimneys will be determined as units from actual count, except new frames and covers.

New frames and covers will be considered as a part of the structure to which the frame and cover is attached and no additional compensation will be allowed therefor.

The quantities of permanent trench resurfacing to be paid for shall be the actual quantities placed within limits up to a maximum width of 3 feet greater than the outside diameter of the pipe or structure. Temporary trench resurfacing shall be paid for by the Contractor.

Trench quantities in excess of the above shall be at the Contractor's expense unless approved otherwise by the Engineer.

71-1.13 Payment - Items of work, measured as provided in Section 71-1.12, "Measurement," will be paid for at the contract price per linear foot for the various sizes of pipes, types of sewer maintenance holes, lampholes, terminal cleanout structures, and the contract price per ton or square foot for the various types of surfacing.

Full compensation for structure excavation; structure backfill; bar reinforcing steel and concrete will be considered as included in the contract price paid for the various items of sewer work and no separate payment will be made therefor.

Shaping the bottoms of new maintenance holes will be considered as a part of the maintenance hole and no separate payment will be made therefor.

Full compensation for all tunneling and jacking of pipe, capping open ends of pipe, joining of pipe to other pipe or structure, shaping bottoms of existing maintenance holes, utility support and protective work operations required to accommodate or safeguard public traffic, testing

the sewer line, furnishing and disposing of water and equipment used for testing and all other incidental work and material required to construct the sewer system shall be considered as included in the prices paid for the various contract items of sewer work and no additional compensation will be allowed therefor.

The above prices and payments shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing sewers, complete in place, as shown on the Project Plans, and as specified in these specifications and the special provisions, and as directed by the Engineer.

71-1.14 Abandonment - Sanitary sewer lateral abandonment shall be done at the property line. Provide bell end or collar with air tight plug, as specified in the U.P.C., at the end of the line.

SECTION 74

STORM AND SANITARY SEWER PUMPING PLANT EQUIPMENT

This section of Caltrans Standard Specifications is deleted in its entirety.

Replace with the following:

Specifications and Plans for pumping plant equipment shall be prepared in accordance with the Municipal Utilities Department Pump Station Guidelines and as approved by the Director of Municipal Utilities.

SECTION 75

MISCELLANEOUS METAL

The following is to be added:

75-1.02 Miscellaneous Iron and Steel - The following specification shall be added to this section of Caltrans Standard Specifications:

75-1.02A Maintenance Hole Frames and Covers - Gray iron castings shall conform to and/or exceed the requirements of ASTM A48-76, Class 30 and test bar size shall be as stated in Table I.

A "Certificate of Compliance" signed by an authorized agent of the manufacturer or supplier shall be required.

Each certificate so furnished shall be accompanied by a copy of test results stating that the material has been sampled, tested, and inspected in accordance with the provisions of the latest issue of ASTM A-48, Gray Iron Castings. Test bars shall be cast and tested for the first lot of casting and every four (4) months thereafter. If production is interrupted for any period longer than four months, test bars shall be cast and tested from the initial lot after production is resumed and every four (4) months thereafter. The first lot is defined as the first castings produced after January 1st of each year. The tension tests specified shall be performed and the results certified by an independent testing laboratory located in the United States of America.

In addition, current certified test reports for testing in accordance with AASHTO HS-20 loading shall be furnished.

Units furnished shall be identifiable with reference to the above tests.

Machined surface tolerances shall produce true, uniform bearing surfaces.

All frames and lids shall be interchangeable with like seat design. Dimensional fit tolerances shall not exceed those allowed on designated specified units detailed on Standard Drawing No. 54.

Maintenance hole frame and covers and catch basin frames and covers shall be wire brushed removing all dirt and loose mill scale and rust and given a coat of coal tar pitch at 180° F.

75-1.02B Identifying Castings - All gray iron castings shall be marked on the top surface with the English name of the country of origin; manufacturer's name, lot number, and initials or logo type. In addition, the month and year of manufacture shall be cast on the frame and cover adjacent to the name of the manufacturer. Such marking shall be made by means of stamping, cast-in-mold lettering, etching, or engraving.

SECTION 76

DOMESTIC WATER FACILITIES

NOTE: THIS SECTION IS ADDED IN ITS ENTIRETY TO THE BLANK SECTION IN CALTRANS STANDARD SPECIFICATIONS.

76-1.01 Description - This work consists of furnishing and installing pressure water pipe control valves, thrust blocks, fire hydrant tees, fire hydrants and service lines, all as shown on the Project Plans or as directed by the Engineer, and as specified in the Standard Specifications and Plans and the special provisions.

76-1.01A Right of Way - All City owned domestic water facilities located on private property shall be installed within a 10' (min.) wide easement which shall have been dedicated to the City of Stockton.

76-1.01B Facilities Standards - Unless otherwise noted, all domestic water facilities shall be designed in accordance with the California Water Works Standards and the American Water Works Association.

76-1.02 Materials - All pipe and fittings (except valves) shall have a minimum working pressure of one hundred twenty five (125) pounds/square inch and conform to the following requirements:

76-1.02B Ductile Iron Pipe - Ductile iron pipe for water and other liquids shall be furnished in the sizes; classes; grades or nominal thicknesses; and joint types designated on the Project Plans or in the Special Provisions.

Ductile iron pipe shall comply with ANSI A21.51 (AWWA C151) and have cathodic protection and test stations.

Ductile iron pipe is to be used on all water crossings or where required by State Health Code sanitary sewer water line clearance regulations. Pipe shall utilize either flange, mechanical or push on rubber gasket joints. Pipe shall be minimum standard thickness with standard cement lining (USA Std. A21.4).

Ductile iron pipe joints shall comply with the following requirements for the types:

Type of Joint	Specifications
Rubber Gasket Push-on Joint	ANSI A21.11 (AWWA C111)
Mechanical Joint	ANSI A21.11 (AWWA C111)
Flanged Joint	ANSI B16.1, B.16.2 and A21.10 (AWWA C110)

Flanged Joint (Threaded Flanges) ANSI B2.1.

All rubber gasket, push-on, mechanical and flanged joint fittings for ductile iron water pipe shall be manufactured in accordance with ANSI A21.10 (AWWA C110).

Unless otherwise specified, the internal surfaces of ductile iron water pipe and fittings shall be lined with a uniform thickness of cement mortar then sealed with a bituminous coating in accordance with ANSI A21.4 (AWWA C104). The outside surfaces of ductile iron pipe and fittings for general use shall be coated with a bituminous coating 1 mil (0.0254mm) thick in accordance with ANSI A21.6 or ANSI A21.51.

76-1.02C Polyvinyl Chloride (PVC) Pipe - Polyvinyl Chloride pipe shall be furnished in the classes, sizes, and grades designated on the Project Plans and Special Provisions.

Polyvinyl Chloride pipe shall meet the requirements of AWWA C-900 "Polyvinyl Chloride (PVC) Pressure Pipe." Pipe sized shall be 6" through 12" only - AWWA Class 150 minimum. All Class 150 pipe shall meet the requirements of DR 18 and Class 200 pipe shall meet the requirements of DR 14 with O.D.

However, pipe sizes from 16" through 24" may be used for transmission lines; no house service taps/laterals are allowed in these sizes. Pipe shall be DR-18 (235 psi) only, conforming to the requirements of AWWA C-905 "Polyvinyl Chloride (PVC) Water Transmission Pipe" in O.D. sizes. Pipe embedment zone (O.D. plus 12") shall conform to City of Stockton Standard Drawing No. 50.

All pipes shall be suitable for use as a pressure conduit. Provisions shall be made for expansion and contraction at each joint with an "O" ring elastomeric gasket seal meeting the requirements of ASTM D-1869 and F-477. Solvent welded joints will not be permitted. The bell section shall be designed to be at least as strong as the pipe wall.

76-1.02D Valves - This specification includes three (3) inch through twelve (12) inch diameter gate valves and twelve (12) inch or larger diameter butterfly valves and operators intended for buried service in a domestic water system.

Gate valves shall be double disc with non-rising stem meeting or exceeding the latest revisions of AWWA C-500 with a design working pressure of one hundred seventy-five (175) psi. Valve pattern shall be Metropolitan or Muller No. A-2380 with valve disc seats of Grade 1 bronze, double disc type with parallel seats.

Butterfly valves shall meet or exceed the latest revisions of AWWA C-504 with a design working pressure of 150 psi. Operators for butterfly valves twenty (20) inches and smaller shall be Class 150; larger operator will be as specified in the special provisions and designed for actual line conditions as covered in AWWA C-504, Appendix A.

Valve ends shall be mechanical joint or flanged in accordance with AWWA C-500 unless otherwise specified.

Valves for use with flanged pipe shall be cast with Class 125 flanges, dimensions and drilling shall conform to ASA B 16.1. Flange boltholes shall be spot faced if flange fillets interfere with both heads and nuts.

Tapping sleeves for A.C. and cast iron water mains shall be full body shell, with full body gasket or split sleeve, end and side gasket seal. Inlet flange and tapping gate valve flanges shall be Class 125 flange. Tapping sleeves shall be M & H 1174 and 1274 (all sizes); Romac SST and Clow 3490-AS (over 12 inch only) or an approved equal. Taps for steel pipe, CMC and/or CML, will require review and approval by the City Engineer.

All stem seals, gate valves and butterfly valves, shall be O-rings only.

Wrench nuts shall be made of top grade cast iron, fitting the top of the valve stem and secured by nut or key. Wrench nuts shall be one and fifteen sixteenth (1-15/16) inch square at the top and two (2) inches square at the bottom.

Valves requiring operating wrenches exceeding six (6) feet in length shall have extension and guides installed in valve boxes.
The open direction shall be left (counter-clockwise) and the closed direction right (clockwise).

76-1.02F Valve Boxes - Valve boxes and covers shall conform to City of Stockton Standard Plan No. 99.

76-1.02G Gaskets - Gaskets for flanged joints shall be full circle one-sixteenth (1/16) inch thick asbestos composition gaskets.

76-1.02H Thrust Blocks - Thrust blocks shall conform to City of Stockton Standard Drawings. Concrete for thrust blocks shall be Class B with one and one-half (1-1/2) inch max. size aggregate in accordance with Section 90 of the Standard Specifications.

76-1.02I Fire Hydrants - Fire hydrants shall conform to the requirements of the Fire Department of the City of Stockton as shown on the Standard Plan No. 101 and the following:

a. All hydrants shall comply with AWWA C502, latest revision.

b. All operating valves shall be located below grade and protected by "break-off" features so that no water flows if hydrant is knocked off.

c. Hydrant main valve seat shall be a minimum 5-1/4 inches.

d. Hydrant valve shall be molded non-swelling rubber.
e. Hydrant main valve seat shall be threaded into a bronze to bronze subseat.
f. Hydrant bury shall be 36 inches from connection to ground flange. Materials to extend the length of bury shall be readily available.

76-1.02J Service Lines - Service lines up to and including meter connection shall be as detailed in City of Stockton Standard Plan Nos. 93 and 94, as applicable for the service intended and with the AWWA Standard C-800.

1. Service line connections are not permitted on pipe sizes 16" and greater.

2. Threads for line pipes shall be as specified in the AWWA standard for threads for underground service line fittings.

3. Type of service line pipe shall be limited to the following:

   a. Copper water tube, Type K or ASTM B-88.

   b. Ultra High Molecular Weight (UHMW) P.E. 3406, P.E. 3408, CS 255-63, Polyethylene as manufactured by Driscopipe, Orangeburg or an approved equal in one (1) inch iron pipe sizes only. Plastic pipe larger than one (1) inch and up to and including two (2) inch iron pipe sizes shall be PB 2110 Polybutylene. Connection of plastic pipe shall be made using Mueller 110 compression connections or approved equal.

   c. Services two (2) inches and larger shall be considered as a special condition and will require the prior approval of the Water Superintendent and City Engineer.

   d. Saddles or service clamps shall be used on all PVC taps and shall be designed specifically for PVC pipe. Saddles or service clamps shall be Rockwell No. 381 or approved equal.

4. Service lines, if abandoned, must be severed at the main.

76-1.02K Water Meters - Unless otherwise specifically noted, water meters will be purchased and installed by the City of Stockton.

For meters larger than two inch it will be the Contractor's responsibility to contact the City of Stockton prior to installation of meter boxes to ascertain the dimensions of the meters currently in stock.

It shall be the Contractor's responsibility to set meter box and service fittings in such a manner that City meter can easily be dropped in place. See Standard Plans for minimum clearance dimensions.

76-1.03 Installation

76-1.03A Installation of Water Mains

76-1.03A(1) Description - The Contractor shall, unless specified otherwise, furnish all material, equipment, tools and labor necessary to do the work required, and unload, haul and distribute all pipe, castings, fittings, valves, hydrants and accessories. The Contractor shall also remove pavement as stipulated; excavate trenches and pits to the required dimensions; excavate bell holes; construct and maintain all bridges for traffic control sheet, brace, and support the adjoining ground or structures where necessary; handle all drainage or ground water; provide barricades, guards, and warning lights; lay and test the pipe, castings, fittings, valves, hydrants, and accessories; backfill and consolidate the trenches and pits; restore the roadway surface unless otherwise stipulated; remove surplus excavated material; clean the site of the work; and maintain the street or other surface over the trenches as specified. All connections to existing lines shall be flanged by fittings with isolation plates.

76-1.03A(2) Excavation - Trench excavation shall conform to the requirements of the City of Stockton Standard Plans No. 50 and No. 51.

The bottom of the trench shall be carefully graded as indicated in Section 71-1.03 of the Standard Specifications.

76-1.03A(3) Jacking - Jacking shall conform to the City of Stockton Standard Plan No. 60.

76-1.03A(4) Pipe Laying - The pipe shall be handled with care at all times and in a manner that meets the approval of the Engineer. Extreme care shall be exercised in the use of any mechanical devices used in laying the pipe to avoid scarring or other damage.

The Engineer shall be the judge of whether a pipe is seriously damaged and any pipe so classified shall be permanently removed from the site of the work.

The inside of all pipes and couplings shall be free from dirt, grease, or other deleterious materials. The open ends of all pipe previously laid shall be adequately plugged water tight whenever pipe laying operations are suspended at the end of each work day, or for any other reason.

Select fine damp earth shall be placed and thoroughly compacted across the bottom of the trench to provide full support of all the pipe. Bells and/or couplings shall have soil removed to provide a uniform bearing.

In joining asbestos cement pipe, a thin coating of non-toxic and water soluble lubricant shall be applied to the entering level and back to the first machined shoulder of the pipe to be coupled. The rubber rings shall be set in the coupling grooves, and the couplings shall be placed between the pipe ends. The pipe shall be moved so that ends butt snugly against the rubber rings. A representative of the pipe manufacturer shall be present when the pipe laying commences in order to insure the proper installation of the pipe.

76-1.03A(5) Backfilling - Backfilling shall not be completed until the pipe has been properly installed to the satisfaction of the Engineer.

Backfill materials shall be placed on both sides of the pipe simultaneously to prevent any undue strain on the pipe.

Imported sand or an approved clean granular material free of all lumps and debris, passing 100% through the 3/4 inch sieve and having 5% to 20% passing the No. 200 sieve, with a minimum sand equivalent of 20 material shall be placed in the trench in six (6) inch layers to a depth of twelve (12) inches above the pipe and shall be hand tamped, or compacted to 85 percent relative compaction.

The balance of the trench shall be backfilled and compacted as shown by jetting or mechanical means on Standard Plans Nos. 50, 50A and 51, 51A, 51B. This Standard shall be used as a minimum in all new construction unless otherwise noted in the Special Provisions.

Backfilling and bedding for P.V.C. pipe shall be performed in accordance with Section 71-1.04 Bedding of these Standard Specifications for P.V.C. pipe.

The Contractor shall do all excavating, loading, hauling, placing and compacting of the material in place.

All pipe damaged during construction operations shall be replaced by the Contractor at the Contractor's expense to the satisfaction of the Engineer.

76-1.03A(6) Trench Resurfacing - Trenches in existing streets, except streets which are to be closed or abandoned, shall be resurfaced with the type of thickness of bases, surfacing or pavement shown on the Standard Plans.

The Contractor shall proceed immediately to resurface any part of any excavation upon notice from the Engineer without waiting for completion of the full length of line.

76-1.03B(1) Testing - The test for hydrostatic pressure shall commence no sooner than seven (7) days after the last concrete thrust block has been cast with standard cement or at least after thirty-six (36) hours with high early strength cement, and after backfilling and compacting the trench to the plane upon which the asphalt concrete surfacing is to be placed. The

Contractor shall take the necessary precautions to insure that the pipe fittings, couplings, valves, and other appurtenances are not displaced during the test. The pipe shall be filled with water at least twenty-four (24) hours prior to the time of the test. Each section of the completed pipe under test shall be subjected to a hydrostatic test pressure of one hundred twenty-five (125) pounds per square inch for two (2) hours. During this period of the test, all pipe shall be inspected for leaks, and any leaks failures, or imperfect construction revealed during the period of tests shall be corrected by the Contractor at the Contractor's own cost and expense.

After a satisfactory hydrostatic pressure test, the line shall be tested for leakage. The line shall be maintained at a sixty (60) pound per square inch pressure for seven (7) days. The leakage during this period shall not exceed 0.100 gallons for each inch of diameter for each joint for twelve (12) foot pipe lengths in the section under test in a twenty-four (24) hour period.

It shall be the Contractor's responsibility to locate and repair the points of line failure; fill, recompact the trench and retest the section of line in the event the line fails the leakage test.

76-1.03B(2) Interruption of Service - No valve or other control on an existing system shall be operated for any purpose by the Contractor. The City of Stockton will operate all valves, hydrants, blowoffs and curb stops.

76-1.03C Disinfecting Water Mains

76-1.03C(1) General –

1. The interior of all pipe, fittings, and other accessories shall be kept as free as possible from dirt, foreign material and bacteria at all times. During pipe laying operations, when bacterial contamination of interior pipe surfaces is obvious or suspected by the Engineer, the Engineer may order said surfaces to be swabbed with an approved bactericidal solution.

   Disinfecting chemicals and additives shall comply with the requirements of Title 22, Division 4, Chapter 18 as Regulated by the State of California, Department of Health Services.

2. Disinfection of water mains shall be insured before permission for their connection to the City's water distribution system will be granted.

   Chlorinated water may be disposed of in the sanitary sewer with prior approval from the Municipal Utilities Department (MUD). Without MUD approval, water must be declorinated and disposed of in the sanitary sewer. Chlorinated water or declorinated water shall not be disposed of in the storm drain system.

Disinfecting water mains shall be performed after all water related appurtenances have been installed.

3. Bacteriological samples used to satisfy the disinfection requirement of section 76-1.03C shall be collected under the direction of a Public Works Department inspector, or the inspector's agent, by personnel trained in the proper techniques for obtaining bacteriological samples, and shall be analyzed by a laboratory certified by the California Department of Health Services. It is suggested that the project contractor to be present to insure that all parties agree to the appropriateness of the sample locations.

4. The Municipal Utilities Department Laboratory is certified to perform the required bacteriological analyses and can provide properly trained personnel to collect samples.

   a. It is not required that the City laboratory perform these tasks. The inspector or contractor may choose to use the services of a commercial laboratory as long as all technical requirements are met.

   b. The City laboratory may be called upon, at no additional cost to the contractor, to collect and analyze one set of samples, and if that test fails, one set of retest samples after resterilization of the main as in section 76-1.03C4. Any sampling/analysis after the first retest will be billed to the contractor on a time and materials basis.

   c. The City laboratory requires that scheduling be done at least 48 hours in advance of the sampling event. Normally this is sufficient time to allow the person assigned to this task to schedule the field work and to insure sufficient facilities exist in the laboratory to complete the analysis.

   d. The City laboratory provides these services to the Public Works Department, not the contractor. There will be no direct communication of analysis results to the contractor; the report of the results of analyses will be made only to the inspector, or the inspector's agent, who requested the test, and to the Deputy Municipal Utilities Department Director/Water & Collection System.

   e. If the City laboratory cannot accommodate the requested time schedule, the inspector or contractor may choose to use a commercial laboratory for sample collection and/or analysis.

5. If a commercial laboratory is used, a copy of the analysis report will be forwarded to the Deputy Municipal Utilities Department Director/Water & Collection System.

76-1.03C(2) Isolation of New Mains - All new water lines shall be completely isolated from any existing main until they have been tested and disinfected to the satisfaction of the Engineer. New mains may be filled from existing mains only by temporary tap thereto and through a State Department of Health approved backflow prevention unit so as to provide positive backflow prevention provided by City of Stockton. When new main is properly disinfected and the isolation dam is removed from connection flange or other type connection is made, extreme care shall be exercised to prevent the entry of contamination. Connection fittings shall be thoroughly swabbed with an approved bactericide immediately prior to their installation.

Flush the mains thoroughly at the end of the contact period. The orthotolidine test shall show no more chlorine in the water leaving the main than in the water entering the main.

The Engineer will collect a sample for bacteriological examination in a sterile bottle provided by the laboratory. On the label, give date, address, and the estimate number for the job. Where possible the sample should be taken from a service located near the end of the chlorination section, otherwise, it may be taken through the same blowoff used for flushing the heavily chlorinated water out of the main so that the blowoff is sterilized.

If the bacteriological tests are unsatisfactory, the main shall be resterilized using Method No. 2, and the sterilization repeated, if necessary, until satisfactory results are obtained.

76-1.03C(3) Method No. 1 - H.T.H. Tablet Method - This method is preferred for short jobs and for small diameter pipe of any kind. It cannot be used where trench water has entered the main. The main cannot be flushed prior to sterilization, so the method requires that the pipe be kept clean during installation.

Using Permatex No. 1 as an adhesive, fasten the required number of tablets (see Table I) to the inside top of each length of pipe. Tubes of Permatex may be purchased locally at any auto parts store. The tablets may be fastened to the pipe before it is placed in the trench providing the top of the pipe is marked to insure that the tablets are on the top of the pipe after installation.

When installing asbestos cement pipe, each butt end shall be treated by using a H.T.H. tablet as a piece of chalk. Fasten extra tablets to the beginning of the first length of pipe. To be sure that these tablets start to dissolve as the water enters the main, they should be placed in rows about half an inch above the bottom of the pipe. Use one tablet for each inch of diameter. For long runs, this should be repeated about every 500 feet.

When using dresser or similar couplings, an additional tablet shall be crushed and placed in the annular space between the coupling and the pipe. Fill the pipe very slowly and proceed as outlined under General Instructions.

76-1.03C(4) Method No. 2 - H.T.H. Solution with Hand Pump Method - This method is general in scope and shall be used when it is necessary to rechlorinate an existing main. When this method is used on a main coupled with dresser or similar couplings, a pinch of H.T.H. powder shall be placed in each coupling as the main is laid.

Equipment required includes an ordinary hand test pump, solution hose, and a five gallon can to contain the chlorine solution.

A compact and convenient assembly can be made by mounting the solution can and the pump on suitable board with a pipe connection from the tank on the suction side of the pump.

H.T.H. comes as a powder which shall be dissolved in water. Strong chlorine solutions should be handled with care since they are irritating to the skin and will damage shoes and clothes.

Make up chlorine solution according to Table II. The quantity required is estimated from Table II. An excess volume should be prepared so as not to empty the container before the job is complete.

Connect pump to main. Use a corporation cock for this purpose and make connection at or ahead of the inlet end of the new line.

After flushing the line thoroughly adjust flow by timing the period required to fill a five-gallon can.

Pump chlorine solution into the line at a rate of one gallon of solution in three minutes.

Continue pumping until orthotolidine tests on a sample taken from discharge end of line being treated shows a red color, or until the odor of chlorine is noticed.

After finishing application of chlorine, close valve or blow-off. Disconnect and flush pump thoroughly with fresh water.

Refer to instruction flushing and sampling.

If the above procedure has to be varied because of some unusual condition, it will be necessary only to regulate the pump, control the water flow, or adjust the strength of the chlorine solution to give a dose of at least 50 ppm.

TABLE I

NUMBER OF TABLETS REQUIRED FOR MAIN STERILIZATION

Length of Section	Diameter of Pipe 2"	4"	6"	8"	10"	12"
13' or Less	1	1	2	2	3	5
18'	1	1	2	3	5	6
20'	1	1	2	3	5	7
30'	1	2	3	5	7	10
40'	1	2	4	6	9	14

TABLE II

CHLORINE SOLUTION STRENGTH HAND PUMP METHOD OF MAIN CHLORINATION

Amount of Chemical in 5 Gallons of Solution

Discharge Rate GPM	H.T.H.
10	0.25 lbs.
20	0.50 lbs.
35	0.75 lbs.
50	1.00 lbs.
75	1.50 lbs.
100	2.00 lbs.

Choose a suitable discharge rate and determine the time required to apply the chlorine from Table III.

Compute the gallons of solution required by dividing this time by 3.

Use the above table to determine the strength of solution required. Example: If the estimate time from Table III is 35 minutes, 11-2/3 gallons will be required; and if the discharge rate is 50 GPM, the solution should contain one pound of H.T.H. in five gallons. Prepare fifteen gallons of solution so as to be sure of having an adequate amount. Operate the hand pump at a rate of five gallons in fifteen minutes, or one gallon in three minutes.

TABLE III

Time in Minutes to Apply Chlorine to 100 Feet of Pipe

Discharge Rate GPM	2"	4"	6"	8"	10"	12"
10	2	7	15	26	41	59
20		3	7	13	20	29
35		2	4	8	12	17
50			3	5	8	12
75			2	4	6	8
100				3	4	6

The above table is used to estimate the time required to apply chlorine. For example: 700' of 8" main can be filled with chlorine solution in 35 minutes with a discharge rate of 50 GPM.

76-1.04 Measurement - The work to be performed under these Standard Specifications will be listed in the contract items by size, class type, or whatever information is necessary for identification.

The length of pipe to be paid for will be the slope length designated by the Engineer.

Pipe bends, wyes, tees, and other branches will be measured by the linear foot for the sizes of pipes involved.

76-1.05 Payment - Items of work, measured as provided in Section 70-1.04, "Measurement," will be paid for at the contract prices per linear foot for the various sizes and types of pipe; the contract unit prices per ton, cubic yard or square foot for the various types of surfacing required.

Full compensation for excavation, backfill, thrust blocks, testing, sterilizing and fittings will be considered included in the various contract items and no additional allowance will be made therefor.

SECTION 77

STORM WATER BASINS

NOTE: THIS SECTION IS ADDED IN ITS ENTIRETY TO THE BLANK SECTION IN CALTRANS STANDARD SPECIFICATIONS DATED JULY 1992.

77-1.01 Definitions

"Detention Basin" – A facility which stores storm water for a relatively short time designed with type of metered outlet.

"Wet Detention Basin" – A lake having a metered outlet utilizing differential water levels for storm water detention purposes.

"Retention Basin" – A facility which stores storm water for an indefinite period of time not usually designed with a metered outlet.

77-1.02 Basin Notes

1. Storm water basins, shall only be allowed if downstream improvements are either not feasible or impractical from a cost standpoint at the time of development. Unless otherwise approved by the City Engineer, basins will not be considered a permanent means for handling peak storm runoff flows. A plan may be required outlining the proper abandonment of the basin in the future.

2. Basins shall be constructed such that the collection system drains into the basin by gravity. Basins designed with surface berms or levees may be subject to additional design criteria other than that stated below.

3. Basins constructed in the proximity of the airport may be subject to additional design criteria due to avigational concerns.

77-1.03 Detention Basin Design

77-1.03A Detention Basins With No Discharge Limitations

77-1.03A(1) Volume – One 10yr – 48hr event calculated by **V=CAR/12**. The rainfall value for a 10yr – 48hr event in Stockton shall be 3.12 inches.

where, C = Runoff Coefficient
A = Area of Collection
R = Rainfall Value = 3.12 inches

77-1.03A(2) Collection System – The starting point for hydraulic grade calculations in collection system design shall be the water surface in the pond generated by the volume of 1 10yr – 48hr storm or the top of the inlet pipe, whichever is higher. Hydraulic grade shall be kept a minimum of 1 foot below the top of curb at any point in the subdivision.

77-1.03B Detention Basins With Discharge Limitations – Design criteria shall be the same as that listed for detention basins without discharge limitations except for as follows:

77-1.03B(1) Volume – 150% of the 10yr – 48hr storm calculated by **V=CAR/12**. The rainfall value for a 10yr – 48hr event in Stockton shall be 3.12 inches.

where, C = Runoff Coefficient
A = Area of Collection
R = Rainfall Value = 3.12 inches

77-1.03B(2) Collection System – The starting point for hydraulic grade calculations in collection system design shall be the water surface in the pond generated by the volume of 1 10yr – 48hr storm or the top of the inlet pipe, whichever is higher. Hydraulic grade shall be kept a minimum of 1 foot below the top of curb at any point in the subdivision.

77-1.03B(3) Water Surface – The maximum anticipated static water surface, determined by the volume criteria above. This water surface must remain at least 1 foot below the top of curb at the lowest point in the subdivision.

77-1.03C Wet Detention Basins – Basins designed as lakes with the fluctuation of water levels allowing detention of storm water runoff may be allowed where feasible. These basins, however, may not be allowed in certain areas of the City due to avigational hazards posed by waterfowl. Volume, collection system, and water surface design requirements for these basins shall be the same as for all other detention basins and will depend on the specific discharge requirements at the given location. Inlet lines and structures shall direct all storm water flows into the basin.

77-1.03D Retention Basins – Retention basins shall not be allowed unless approved by the City Engineer.

SECTION 86

SIGNALS, LIGHTING, AND ELECTRICAL SYSTEMS

The following are to be added to the appropriate sections of Section 86 of the Cal Trans Standard Specifications:

86-2.08E Signal Interconnect Cable (SIC) – Single mode fiber optic cable (minimum 12 strand) shall be installed from any new or modified traffic signal to the nearest available connection point on the City's fiber optic communication network. All electronic equipment necessary for the traffic signal to communicate with the City's central traffic control system shall be required.

2 ½" PVC (Schedule 80) interconnect conduit shall be installed between the new or modified traffic signal and the nearest available connection point on the City's fiber optic communication network. No. 6 pull boxes shall be installed at +/- 500 feet intervals over the length of interconnect conduit.

86-2.09B Installation - Traffic monitoring camera(s) shall be installed as part of new or modified traffic signals. Traffic monitoring camera(s) shall be either one pan-tilt-zoom (PTZ) camera or four fixed cameras per intersection. Fiber optic video/data modems (field and central) shall be installed to transmit the video images and data control (PTZ) between the traffic signal and the City's central traffic control system.

Emergency Vehicle Pre-emption detectors shall be installed on luminaire arms for each approach to a new or modified traffic signal. All accompanying electronic equipment necessary to send the pre-emption signal to the traffic signal controller shall be supplied and installed.

SECTION 90

PORTLAND CEMENT CONCRETE

The following is added to the appropriate sections of Section 90 of the Cal Trans Standard Specifications:

On reconstruction and removal projects which remove sidewalk, the sidewalk shall be replaced with a score pattern, either matching the existing pattern or meeting current sidewalk installation standards for new sidewalks, which most enhances the visual appearance of the whole sidewalk. The overall trend toward a specific pattern (new or existing) shall be considered in the decision. The Engineer shall make the final determination of the score pattern to be used.

The use of fly ash to improve the workability of concrete may be allowed subject to approval by the City Engineer. The amount of fly ash to be used shall be per an approved mix design. Substitution of fly ash or other mineral admixture in place of the required portland cement shall not be allowed.

SECTION 100

STREET OPENING AND PAVEMENT RESTORATION REGULATIONS

NOTE: THIS SECTION IS ADDED IN ITS ENTIRETY TO THE BLANK SECTION IN CALTRANS STANDARD SPECIFICATIONS.

100-1.01 Excavation - Any trench cuts within the street right of way to access **or install** a utility line or any related facility in excess of four (4) square feet or four (4) feet long, whichever is smaller, shall be considered an excavation and requires an excavation permit, which will be issued as part of an encroachment permit.

100-1.011 Excavator – The applicant/permitee to whom an encroachment permit is issued for the purposes of excavation may be referred to, for purposes within this section, as the excavator for the project.

100-1.012 Excavation Permit – The Encroachment Permit that is issued for any work within the street right of way that meets the definition of an excavation as described in Section 100-1.01, above, shall be referred to as an excavation permit for purposes within this section.

100-1.013 Trench Cut Fee - All excavations as defined above are subject to the trench cut fee. The fee shall be collected as part of the encroachment permit fee for the project.

100-1.02 Moratorium

1. Newly constructed or resurfaced streets shall be termed moratorium streets within this section. Permission to excavate in newly constructed or resurfaced streets will not be granted for three (3) years after the completion of street overlays. An overlay consists of a ½ inch or thicker layer of asphalt. For those streets with chip seal, slurry seal coatings, or micro paving with less than ½ inch of new pavement, the moratorium shall be for three (3) years. Utilities shall plan well enough in advance to determine alternate methods of making necessary repairs to avoid excavating in newly resurfaced streets. Exceptions to the above policy are as follows:

   A. Emergencies which endangers life or property.

   B. Interruption of essential utility service.

   C. Work that is mandated by City, State or Federal legislation.

D. Service for buildings where no other reasonable means of providing service exists.

E. Other situations deemed by the City Engineer to be in the best interest of the general public.

2. To excavate in a moratorium street a waiver must be obtained.

A. To request a waiver, the applicant must submit a written request to the City Engineer or his designee. The request must include:

1) The location of the excavation.

2) Description of the work to be performed.

3) Why the work was not performed before the street was paved.

4) Why the work can not be deferred until after the moratorium

5) Why the work can not be performed at another location.

6) Why is it justified to excavate a moratorium street.

B. Any excavation in the moratorium streets will be repaired with full lane paving on the street as follows: (See Drawing No. 50-E, and refer to section 100-1.06 paving).

1) Overlaid or reconstructed streets: All lanes that are affected shall be ground down 1.5 inches and repaved with 1.5 inches of asphalt concrete.
2) Slurry sealed, chip sealed, or microsurfaced streets: All lanes that are affected shall be resurfaced per Section 100-1.06 paving.
3) A minimum of one (1) ft. on either side of trench shall be resurfaced if the excavation is a lateral cut. For longitudinal trenches the entire length plus one (1) ft. on either end shall be resurfaced.
4) Exception – Full lane width restoration shall not be required if the work is not considered an excavation as defined in section 100 – 1.01.

100-1.03 Permits - Any and all construction work within the city right of way shall be done by obtaining an encroachment permit. Anyone doing excavation work within the City of Stockton street right-of-way shall obtain an encroachment permit for the purposes of

excavation in addition to any other permits required. This also applies to all City departments.

1. The permit application may be obtained at the City's Permit Center. A faxed copy may be obtained by calling 937-8900.

2. Except in an emergency, excavation permits shall be taken out in advance of excavation work. An emergency is considered to exist only when life or property is endangered or when an essential utility service is or may be interrupted during weekends, holidays, or between 5 p.m. and 8 a.m. of normal working days

3. The excavator shall notify the Permit Center and apply for an excavation permit for "emergency work" within four (4) hours after the Permit Center opens.

4. As a condition of the permit to excavate, the applicant shall have been provided an inquiry identification number by a regional notification center (Underground Service Alert, USA) pursuant to Section 4216, Chapter 1153, Assembly Bill #1606 of the California State Law.

5. Prior to applying for an excavation permit, the excavator must register with the Public Works Department. The owner or the contractor performing the work may apply for the permit. The owner of the facility shall determine who applies for the excavation permit. However, if the applicant is not the owner of the facility to be excavated, the applicant must provide documentation that the applicant is authorized to act on behalf of the owner.

   A. The following must be provided to become registered to get an excavation permit:

      1) A Cash Deposit equal to 3% of the project cost with a minimum of $1000 and a maximum of $25,000. Companies working under a franchise agreement with the City are not required to post the cash deposit until they have violated the City standards or permit requirements.

      2) A current Business License.

      3) Current evidence of Insurance.

      4) 24 hr. Phone Number for emergencies.

      5) The name, telephone number, and mailing address (fax number, pager,

and e-mail address if available) of the person who will receive all official correspondence from the Department.

B. If an account is past due or not in good standing, a permit cannot be issued until the account is brought into good standing. The account is past due if the fines are not paid and are deducted from the deposit. To bring the account to good standing, all fees and fines must be paid.

6. If an excavator damages other facilities during their excavation work:

A. They do not need another excavation permit if no additional excavation is required to repair the damaged facility. In this case the original permittee shall maintain the site and restore the pavement.

B. They need an additional excavation permit if additional excavation and trenches are needed to repair the damaged facility.

7. All applications shall include a plan indicating the following:

A. Name of the street to be excavated and the nearest cross streets.

B. Distance from the face of the curb.

C. Distance from the intersection.

D. The size of the excavation (length and width).

E. The location of any above ground facilities to be installed, showing:

1) Distance from curb and any street facilities/furniture.

2) Purpose of the facility.

3) Size of the facility.

4) Location of doors and door swing.

F. The location of any underground facilities to be installed showing:

1) Conduits vaults, maintenance holes, pipes, etc.

2) Structural detail and additional information for installation of the

structures such as vaults and maintenance holes.

3) The construction method of the structure to be installed.

4) Construction detail, locations, size, design criteria and the purpose of the facility.

G. Cross section of a typical trench indicating:

1) The approximate depth of the facility to be installed.

2) Trench backfill depth, compaction and layer depths.

3) Pavement section detail (type and depths)

4) Plans, structural details, and trench cross section must be signed and stamped by a licensed Civil Engineer, when legally required.

H. The plan may show the approximate location of the excavation provided that on an "as-built" plan, the exact location of the excavation is shown. This shall be submitted prior to the permit being finalized and filed.

8. Pre-Construction meeting:

A. A pre-construction meeting shall be held for all projects that are scheduled to take longer than 15 working days to complete.

B. The owner, contractor, any other agency that is involved and the Public Works Department shall attend this meeting.

C. There will be a fine for projects that are supposed to be completed within 15 days, and are not completed within the allowed time, if a pre-construction meeting was not held.

D. A traffic control plan shall be provided with the submittal of the application, and approved prior to the pre-construction meeting.

9. Permit duration shall be indicated on the permit:

A. All permits shall include estimated start and completion dates. A permit is valid from the construction start date specified on the approved permit until the specified completion date.

B. Excavation permits are not valid if other required permits are not obtained or required notifications are not given.

C. No disruption of traffic is allowed after 3:00 PM and before 9:00 AM unless specifically approved for these hours.

D. Some permits may be valid on specific dates. They may be approved with special conditions specifying the dates:

1) When work shall not be done.

2) When work must be completed.

3) Before which work shall not start.

E. Permits expire and become void unless otherwise amended:

1) Thirty days after the start date, if no work has begun.

2) If the work is not diligently prosecuted and there are long delays after the work has started.

3) When the excavation, including the trench restoration is not completed within the duration specified on the permit or on the date specified on the permit as the expiration date.

F. The work is determined to be proceeding diligently if:

1) Once a project begins, work continues on a daily basis, except for weekends, holidays, inclement weather, labor disputes or any other emergency.

2) Once a project begins, the work continues uninterrupted until such work no longer affects public convenience, health or safety. If the project is a multi agency project, a one-week time will be allowed for one agency to move out and another to move in to complete their work.

3) The permittee ensures that all necessary materials and supplies are on hand and ready for use so as not to delay the excavation and the prompt restoration of the public right-of-way.

10. A valid permit may be extended by:

    A. Requesting an extension prior to the expiration date by:

        1) Specifying the dates that need to be changed

        2) Explaining why an extension is needed.

11. All the excavation permit fees are due at the time the permit application is submitted.

    A. Checks should be made out to the City of Stockton. The check shall include:

        1) The permit number

        2) The type of fees being paid (Administration fee, Inspection, extension, reapplication, etc.)

        3) All the fees, fines and penalties, not collected with the application will be billed by the city and shall be paid within 30 days. If they are not paid within 30 days, then these fees, fines and penalties will be deducted from the deposit. Utility companies working under a franchise agreement have 90 days to pay. If a contractor working for a utility company does not pay, the owner/utility company will be responsible to pay these fees, fines, and/or penalties.

        4) If a violation occurs and the fines are deducted from the deposit, no other application will be processed until the deposit has been put in place with the city and all conditions are met. For companies without a deposit, if the fines are not paid on time, no other permit will be issued.

12. If an application has been withdrawn or an approved permit is cancelled prior to the start of work:

    A. Inspection fee and trench cut restoration fees will be refunded.

    B. To request a refund a written request must be submitted to the City Engineer.

C. The request shall include:

1) The reason for cancellation or withdrawal

2) The application number

13. By accepting an excavation permit, the permittee and the owner of the facility(ies) for which the permit has been issued agree:

A. To follow all rules, regulations, special conditions, and code requirements.

B. To assure that their employees, contractors, and subcontractors comply with all rules, regulations, permit conditions and code requirements.

C. To indemnify the city.

14. The excavation permit must be available during work periods at the excavation site, until the project is completed and signed off by the City. Permit must be shown to the city employees on request.

15. The City and various utility companies must coordinate their Capital Improvement Programs. This information shall be shared through the monthly utility coordination meeting.

The information about any planned work in the street right-of-way shall be shared at the earliest possible time.

Various utility owners are encouraged to coordinate their excavation of the streets so that all work is done simultaneously and that the street is not excavated frequently within the same year.

16. The excavator shall provide public notifications when excavating in the public right-of-way.

A. Provide 11"x17" posters with 1-inch minimum letters at beginning and end of the project and every 300 feet in between. Notes must contain:

1) The names, address, and telephone number of the owner and the permittee.

2) The start and completion dates of the project.

B. Major projects lasting 15 working days or longer, the excavator shall:

1) Mail notices to or notify, after the permit has been issued but no more than 30 days before the anticipated start date of work:

   a) Property owners, residents, or occupants of the affected blocks.

   b) Schools and churches in the area and the San Joaquin Regional Transit District.

   c) Provide the City with a copy of the notice.

2) At least 5 days but not more than 15 calendar days prior to starting construction, post and maintain 11" X 17" notices at beginning and end of the project and every 300 feet in between and deliver a copy of same notice to each dwelling unit on the block. The notices must contain:

   a) The name, address, and telephone number of the owner and the permittee.
   b) A description of the project.
   c) The start and completion dates of the project.
   d) The name, address and 24-hour telephone number of a contact person.

17. A project sign is required for all major projects to be installed at either end of the project. The location for the sign to be worked out by the excavator and the City.

   A. The sign shall be a minimum of 24" x 36" with 2" minimum letters. It shall be hung on 4" x 4" wooden posts or a standard metal sign posts and include:

      1) Project name, description, and Permit number.

      2) Permittee's name, address and 24 hour phone.

      3) Owner's name.

      4) Start date and completion date of the project.

100-1.04 Excavation Material

1. Pavement shall be cut to a straight, neat, vertical line prior to excavation.

2. All excavated material not suitable for backfilling shall be removed from the job site within twenty-four (24) hours. Excavated material suitable for backfilling may be stored on the job site for a maximum of five (5) working days, provided it does not occupy any more street space than the permit allows and provided this material is completely prevented from blowing, washing, or being thrown about at all times. Material may be stored on the adjacent private property if a written approval from the property owner has been obtained.

3. No trench shall be opened on any street that is not backfilled or plated at the end of the same day. Fines will be charged if any trench is left open.

100-1.05 Backfill

1. Trenches shall be backfilled with sand or suitable site excavated material. Compaction of backfill shall be in accordance with Drawing No. 50 or 50-A.

2. When undermining occurs, remove existing pavement as required to compact the backfill and restore the pavement.

3. Each encroachment permit will specify the number of compaction tests required. Each compaction test shall be certified by an independent laboratory and submitted to the City Encroachment Permit Inspector. If the results of compaction test show generally poor or marginal compliance with City compaction requirements, the number of compaction tests may be increased by the Engineer to help insure that proper compaction is being achieved.

4. A CONTROL NUMBER SHALL BE OBTAINED by calling (209) 937-8900 one (1) day in advance of the start of work on any encroachment permit. A copy of the permit and control number shall be on site during the construction.

100-1.06 Paving

1. Trenches shall be paved as shown on Drawing No. 50 or 50-A. After the trench has been backfilled and immediately prior to placing asphalt concrete, the existing asphalt concrete shall be saw cut, or milled according to City Standards, to a vertical face. New AC paving shall be butt joined to the existing asphalt concrete vertical face. No feathering of new paving to existing paving is allowed. The vertical faces shall be tack coated. In moratorium streets, placement of the final one and one-half (1 ½) inches of AC wearing surface shall be done by a paving machine or spreader box. Asphalt concrete shall be delivered and compacted in accordance with the Standard Specifications and Plans

To allow for proper placement of the new pavement section, damaged pavement outside of the original trench cut lines shall be removed by cutting in lines perpendicular to or parallel to the original trench lines. No diagonal cuts are to be made. Undamaged pavement of three (3) feet or less between two damaged areas shall also be removed. (See Drawing No. 50-B)

2. Pavement will be restored using the "T Section" shown on Drawing No. 50.

3. For trenches in moratorium streets parallel to the centerline of the street, the entire lane shall be key-cut one and one-half (1 ½) inches, deep and repaved with asphalt concrete. For trenches in moratorium streets with chip seal or slurry seal coatings, the entire lane shall be resurfaced with these coatings.

4. Trenches in concrete streets shall be paved with concrete pavement. The thickness of the new pavement shall be equal to the thickness of the existing pavement with the minimum thickness to be six (6) inches in the roadway.

5. Trenches in arterial streets, with asphalt wearing surfaces, shall be paved with not less than eleven and one-half (11 ½) inches asphalt concrete topped with one and one-half (1 ½) inches of asphalt concrete wearing surface or match the existing pavement if it is more.

6. Trenches in local and collector streets shall be paved with not less than six and one-half (6 ½) inches asphalt concrete topped with one and one-half (1 ½) inches of asphalt concrete wearing surface or match the existing pavement if it is more.

7. Pavement shall be restored within fourteen (14) working days from the time the entire trench is backfilled. For minor excavations such as service installations, the pavement shall be restored within thirty (30) working days from the time the entire trench is backfilled. The asphalt concrete wearing surface shall be placed within five (5) working days after placement of asphalt concrete base, weather permitting.

8. Asphalt pavement shall be compacted to obtain a minimum of ninety-five percent (95%) of relative compaction. The asphalt concrete wearing surface shall have no irregularity greater than five-sixteenths of an inch (5/16") in ten feet (10') in any direction.

9. On collector and arterial streets steel plates shall be used when ordered by the permit inspector to facilitate traffic flow and to protect the excavation until finished pavement is restored. Steel plates used to bridge a street opening shall be ramped to the elevation of the adjacent pavement and secured against movement

in any direction. Temporary ramps shall be constructed of asphalt and shall have a gradual slope. On all other streets, temporary asphalt cutback is permitted.

10. After trench paving, utility trenches shall be color-coded with the 4" stenciled initials of the company doing the trench. These initials will be prescribed by the City of Stockton as stated below and the color shall be as prescribed by the Underground Service Alert (USA). The initials shall be stenciled on the existing asphalt adjacent to the new trench. When paving is complete, the initials shall be painted, using Krylon (or an approved equal), at the beginning and end of each trench and at each intersection, if applicable. The use of colored identifying disks in place of painting is allowed.

Company	Color	Initials
PG&E - Electric	Red	PG&E
PG&E - Gas	Yellow	PG&E
Pacific Bell	Orange	PB
Cable TV	Orange	TV
Cal Water	Blue	CW
City of Stockton - Water	Blue	COS
City of Stockton - Electric	Red	COS
City of Stockton - Sewer	Green	COS

Any agency not listed above must contact Public Works to be assigned initials before performing any excavation or trenching activities in the City of Stockton.

USA Codes are:

Electric	Red
Gas-Oil	Yellow
Communication - CATV	Orange
Water	Blue
Sewer	Green
Temporary Survey Markings	Pink
Proposed Excavation	White

All painted USA markings shall be removed by the permittee after the work has been completed.

11. Wheelchair ramps shown on Drawing No. 31 or 32 shall be constructed where any portion of the curb, at a legal pedestrian crosswalk or any portion of the sidewalk in immediate contact with such curb is removed, except where there is an existing

wheelchair ramp in the cross-walk or where there is a subsidewalk basement behind the crosswalk.

12. All damaged pavement markings and striping shall be replaced and restored by the excavator.

100-1.07 Defects

1. Depressed trench pavement shall be repaired as follows:

   A. Wearing surface defects - remove and restore wearing surface.

   B. Major defects - excavate, remove and restore surface and base.

   C. The Permit Inspector will determine the severity of the defect.

2. Work not complying with the above requirements shall be rejected, removed, and redone to the satisfaction of the City Engineer.

3. The owner of the facility/utility company is responsible for the roadway defects appearing after the permittee restores the trench (area adjacent to the trench). The owner is responsible for maintenance, repair or reconstruction of the excavation site's affected area until the city reconstructs, repaves, or resurfaces the street.

4. If there is a trench related failure after the work by the city, the owner of the facility/utility company is responsible for its repair.

5. The owner of the facility/utility company is responsible to maintain the trenches and repair any defects that may appear. The City Engineer will determine who is responsible for a defect when one is detected and will notify the responsible party and direct them to repair the facility.

   When the City determines that an excavation or a defect is hazardous or constitutes a public nuisance or other imminent threat to public health, safety, or welfare, the City Engineer may order the responsible party to remedy the condition immediately.

   A. If the responsible party refuses or fails to make the needed repairs immediately, the City will make the repairs and:

      1) The responsible party will be charged all the actual costs including administration, construction, consultant fees, equipment, inspection,

notification, remediation made necessary by the action of the permittee, repair, and restoration.

2) The repair or restoration by the City does not relieve the responsible party from liability for future pavement failures.
3) If the responsible party fails or refuses to pay the restoration cost, the cost of the repair or restoration will be deducted from the responsible party's deposit.

6. If the owner/person responsible for the roadway defect does not make the required repairs, the City will make the repairs and the responsible party will be charged for all the actual cost of repair, including but not limited to administration, construction, consultant fees, equipment, inspection, notification, remediation made necessary by the action of the permittee, and restoration. Repairs or restoration by the City does not relieve the responsible party(s) from liability for future pavement failures. If the responsible party fails or refuses to pay the cost of the repair, the cost will be deducted from the responsible party's deposit.

100-1.08 Violations

100-1.08.1 Excavation Violations - Any violation of the above regulations may result in the revocation of the encroachment permit and/or be subject to a citation process and/or fine. The fines for various violations are as follows:

VIOLATIONS	PENALTY (Not to exceed amount shown)
1. Working without a Permit(s), control number not called in.	$1,000 and Stop Work
2. Excavation without providing Public Notice	$1,000 and Stop Work
3. Beginning a "Major Project" without having a Pre-Construction Meeting	$500 per occurrence, per day
4. Violation of Permit Conditions	$500 per occurrence, per day

VIOLATIONS	PENALTY (Not to exceed amount shown)
5. Improper Site Protection: Improper plating, path of travel, barricading, etc.	$500 per occurrence, per day
6. No permit on site	$250 per occurrence, per day
7. Improper Trimming of Trench	$250 per Trench
8. Any trench left open after the allowed work hours that is not back filled and covered.	$250 per day
9. Improper Public Notice: No Project Sign, wrong information on sign/notice	$100 per block, per day
10. Non-compliance with Trench Restoration Requirements	$250 per trench, per day
11. Improper Housekeeping: Failure to remove spoil, dirty site, no sweeping, etc.	$100 per block, per day
12. Other Excavation Code Violations	$100 per occurrence, per day
13. Call for Inspection but not ready to be inspected	$250 per occurrence, per day

The above fines, when assessed, shall be deducted from the cash deposit required by 100-1.03 5A of this section or will be paid by the applicant if there is not a cash deposit.

To appeal any citations, fines, or other requirements, the Stockton Municipal Code procedure for appeal shall be followed. If there are any fines they must be paid and will be reimbursed if the appeal is valid.

100-1.08.2 Other Violations-Any violation of the above regulations and/or Chapter 9 of the Stockton Municipal Code may result in the revocation of the encroachment permit

and/or be subject to an administrative citation per Stockton Municipal Code Sections 1.042-1.059.

Violations include but are not limited to working without a permit, failure to obtain a control number before starting work, no permit on the work site, failure to comply with the permit's conditions, provisions and requirements, improper work area housekeeping, and work left open after allowed work hours that is not filled/covered.

SECTION 101

STREET MICROSURFACING

NOTE: THIS SECTION IS ADDED IN ITS ENTIRETY TO THE BLANK SECTION IN CALTRANS STANDARD SPECIFICATIONS.

101-1.01 Description - The work shall consist of installing a specialized slurry seal – either Type II or Type III Microsurfacing - on streets as shown on the plans. The installation work shall generally consist of the following:

1. Cleaning of existing pavement surface.
2. Removal of existing pavement markers.
3. Mixing of a polymer modified, cationic microsurfacing emulsion (MSE) - water and additives, mineral filler, and aggregate - and spreading of the mixture on cleaned pavement surface
4. Re-instatement of pavement markings / markers.

101–1.02 Materials:

101-1.02A Microsurfacing Emulsion (MSE) – The MSE shall be homogenous. The polymer shall be milled or blended into the asphalt or blended into the emulsifier solution prior to the emulsification process. The MSE shall contain a minimum of 3 percent polymer solids based on mass of MSE residual asphalt. A Certificate of Compliance shall be furnished with each shipment of MSE in conformance with the requirements in Section 94-1.05, "Test Report," of the Standard Specifications.

The MSE shall conform to the following requirements:

Requirements for Polymer Modified, Cationic Microsurfacing Emulsion (MSE)

Tests on MSE:

Test	Test Method	Requirement
Viscosity @ 25°C, SSF	AASHTO T 59	15-90 sec
Sieve Test, max.	AASHTO T 59	0.30%
Settlement, 5 days, max.	ASTM D 244	5%
Storage Stability, 1 day, max.	AASHTO T 59	1%
Residue by Evaporation, min.	California Test 331	62%

Tests on Residue from Evaporation Test:

Test	Test Method	Requirement
G* @ 20°C, 10 rad/sec, MPa	AASHTO TP 5	Report Only
Penetration @ 25°C	AASHTO T 49	40-90
Phase Angle @ 50°C, 10 rad/sec, PA (max) - PA base	AASHTO TP 5	Report Only
Softening Point, min.	AASHTO T 53	57°C
Stiffness @ -12°C, MPa, and M-value	AASHTO TP 1	Report Only

101-1.02B Water and Additives - Water shall be of such quality that the asphalt will not separate from the MSE before the microsurfacing is placed on the pavement. If necessary for workability, additives that will not adversely affect the microsurfacing product may be used.

101-1.02C Mineral Filler - Mineral filler shall be portland cement or hydrated lime that is free of lumps. Portland cement shall be either Type I, Type II, Type III or a combination thereof. The type of mineral filler shall be determined by the Contractor based on laboratory mix designs. The mineral filler will be considered part of the aggregate gradation requirement.

101-1.02D Aggregate - Type II aggregate may be used on low to moderate speed traveled ways, residential streets, pedestrian traffic areas, shoulders and areas where a smoother surface texture is desired. Generally, Type III aggregate is used on high speed traveled ways and areas where a coarse surface texture is desired. Type III aggregate must be used when filling wheel path depressions and on bridge decks. **The Engineer shall decide the aggregate type to be used on the project.** The aggregate shall be free from vegetable matter and other deleterious substances. Aggregate shall be free of lumps and oversize particles. One hundred percent of the parent aggregate shall be larger than the largest stone in the gradation to be used.

Aggregate shall conform to the grading and quality requirements prior to the addition of the MSE. If aggregates are blended, each component aggregate shall conform to the Sand Equivalent and Durability Index requirements.

The percentage composition by mass of aggregate, including mineral filler, shall conform to the following grading requirements:

TYPE II

Sieve Sizes	Percentage Passing
9.5-mm	100
4.75-mm	94 - 100
2.36-mm	65 - 90
1.18-mm	40 - 70
600-µm	25 - 50
75-µm	5 – 15

TYPE III

Sieve Sizes	Percentage Passing
9.5-mm	100
4.75-mm	70 – 90
2.36-mm	45 – 70
1.18-mm	28 – 50
600-µm	19 – 34
75-µm	5 – 15

The aggregate, excluding mineral filler, shall conform to the following quality requirements:

Test	California Test	Requirement
Sand Equivalent, min.	217	68
Durability Index, min.	229	55
Percentage of Crushed Particles, min.[1]	205	100%
Los Angeles Rattler Loss at 500 Rev., max.[2]	211	35%

Notes:

1. California Test 205, Section D, is amended to read: "Any particle having 2 or more freshly, mechanically fractured faces shall be considered a crushed particle."
2. California Test 211, Los Angeles Rattler, shall be performed on the parent aggregate before crushing

If the results of the aggregate grading do not meet the specified gradation, the microsurfacing represented by the test shall be removed. However, if requested in writing by the Contractor and approved by the Engineer, the microsurfacing may remain in place and the Contractor shall pay to the City $2.00 per ton for the aggregate represented by the tests and left in place.

If the results of the Sand Equivalent test for aggregate do not meet the specified requirement, the microsurfacing represented by the test shall be removed. However, if requested in writing by the Contractor and approved by the Engineer, the microsurfacing may remain in place and the Contractor shall pay to the City $2.00 per ton for the aggregate represented by the tests and left in place.

When the results of both the aggregate grading and the Sand Equivalent tests do not conform to the specified requirements and if the microsurfacing is allowed to remain in place, both payments to the City shall apply.

No single aggregate grading or Sand Equivalent test shall represent more than 275 tons or one day's production, whichever is smaller.

101-1.03 Mix Design - At least 10 days before the microsurfacing placement commences, the Contractor shall submit for approval of the Engineer a laboratory report of tests and a proposed mix design covering the specific materials proposed for use on the project.

The percentages of each individual material proposed in the mix design shall be shown in the laboratory report. Adjustments may be required during construction based on field conditions. Individual materials shall be within the following limits.

MSE Residual Asphalt	5.5% to 9.5% by dry mass of aggregate
Water and Additives	As needed
Mineral Filler	0% to 3% by dry mass of aggregate

The mix design and aggregate tests shall be performed by a laboratory capable of performing the applicable International Slurry Surfacing Association (ISSA) tests. The proposed microsurfacing mixture shall conform to the specified requirements when tested in conformance with the following tests:

Test	ISSA Test Method	Requirements
Wet Cohesion @ 30 Minute (Set), min. @ 60 Minute (Traffic), max.	TB* 139	 12 kg-cm 20 kg-cm
Excess Asphalt, max.	TB* 109	540 g/m^2
Wet Stripping, min.	TB* 114	90%
Wet Track Abrasion Loss 6-day Soak, max.	TB* 100	 810 g/m^2
Displacement Lateral, max. Specific Gravity After 1000 Cycles of 57 kg, max.	TB* 147A	 5% 2.10
Classification Compatibility, min.	TB* 144	(AAA, BAA) 11 grade points
Mix Time @ 25°C, min.	TB* 113	Controllable to 120 Seconds

TB* = Technical Bulletin

The laboratory that performed the tests and designed the mixture shall sign the laboratory report. The report shall show the results of the tests on individual materials and shall compare their values to those required by these special provisions. The report shall clearly show the proportions of aggregate, water (minimum and maximum), additive usage, mineral filler (minimum and maximum), and MSE residual asphalt content (minimum and maximum) based on the dry mass of aggregate. The laboratory shall report the quantitative effects of moisture content on the unit mass of the aggregate (bulking effect) in conformance with the requirements of ASTM Designation: C 29M. Previous laboratory reports covering the same materials may be accepted provided the material test reports were completed within the previous 12 months. The mix design shall further show the recommended changes in water, additive, and mineral filler proportions for high temperature weather conditions by reporting proportions of materials required for 60 seconds of mix time with materials heated to 38°C. This 38°C mixing report will not be required for projects requiring nighttime application.

The component materials used in the mix design shall be representative of the microsurfacing materials proposed by the Contractor for use on the project.
Once the mix design is approved by the Engineer, no substitution of other material will be permitted unless the materials proposed for substitution are first tested and a laboratory report is submitted for the substituted design in conformance with these special provisions. Substituted materials shall not be used until the mix design for those materials has been approved by the Engineer.

The completed mixture, after addition of water and additives, if additives are used, shall be such that the microsurfacing mixture has proper workability. At the expiration of the time allowed by the Engineer for closure of lanes the microsurfacing mixture shall be sufficiently cured to support unrestricted traffic.

101-1.04 Proportioning - Aggregate, water, additives (if used), mineral filler, and MSE shall be proportioned by volume utilizing the mix design approved by the Engineer. If more than one kind of aggregate is used, the correct amount of each kind of aggregate to produce the required grading shall be proportioned separately, prior to adding the other materials of the mixture, in a manner that will result in a uniform and homogeneous blend.

The aggregate shall be proportioned using a belt feeder operated with an adjustable cutoff gate. The height of the gate opening shall be determinable. The MSE shall be proportioned by a positive displacement pump. Variable rate emulsion pumps, if used, shall be calibrated and sealed in the pump's calibrated condition in conformance with California Test 109 prior to usage.

The delivery rate of aggregate and MSE per revolution of the aggregate feeder shall be calibrated at the appropriate gate settings for each mixer-spreader truck used on the project in conformance with California Test 109.

The aggregate belt feeder shall deliver aggregate to the pugmill with such volumetric consistency that the deviation for any individual aggregate delivery rate check-run shall not exceed 2 percent of the mathematical average of 3 runs of at least 3 tons each. The emulsion pump shall deliver MSE to the pugmill with such volumetric consistency that the deviation for any individual delivery rate check-run shall be within 2 percent of the mathematical average of 3 runs of at least 1135 L each. The water pump shall deliver water to the pugmill with such volumetric consistency that the deviation for any individual delivery rate check-run shall be within 2 percent of the mathematical average of 3 runs of at least 1135 L each.

The MSE storage tank shall be located immediately before the emulsion pump and shall be equipped with a device which will automatically shut down the power to the emulsion pump and aggregate belt feeder when the MSE level is lowered to a point where the pump suction line is exposed.

A temperature-indicating device shall be installed in the emulsion storage tank at the pump suction level. The device shall indicate the temperature of the MSE and shall be accurate to within 5°C.

The belt delivering the aggregate to the pugmill shall be equipped with a device to monitor the depth of aggregate being delivered to the pugmill. The device for monitoring the depth of aggregate shall automatically shut down the power to the aggregate belt feeder whenever the depth of aggregate is less than the target depth of flow. A second device shall be located where the device will monitor the movement of the aggregate belt by detecting revolutions of the belt feeder. The devices for monitoring no flow or belt movement shall automatically shut down the power to the aggregate belt when the aggregate belt movement is interrupted. The device to detect revolutions of the belt feeder will not be required where the aggregate delivery belt is an integral part of the drive chain. To avoid erroneous shutdown by normal fluctuation, a delay of 3 seconds will be permitted between sensing and shutdown of the operation.

101-1.05 Mixing and Spreading Equipment - The microsurfacing shall be mixed in continuous pugmill mixers of adequate size and power for the type of microsurfacing to be placed. All indicators shall be in working order prior to commencing mixing and spreading operations.

Mixer-spreader trucks shall be equipped to proportion the aggregate, water, additives (if used), mineral filler, and MSE by volume. Rotating and reciprocating equipment on mixer-spreader trucks shall be covered with metal guards.

The mixer-spreader truck shall not be operated unless low-flow and no-flow devices and revolution counters are in good working condition and functioning and metal guards are in place. The required indicators shall be visible while walking alongside the mixer-spreader truck.

Aggregate feeders shall be connected directly to the drive on the emulsion pump. The drive shaft of the aggregate feeder shall be equipped with a revolution counter reading to the nearest one-tenth of a revolution.

In addition to the provisions in the fourth paragraph of Section 5-1.10, "Equipment and Plants," of the Standard Specifications, the identifying number of mixer-spreader trucks shall be at least 75 mm in height, located on the front and rear of the vehicle.

The microsurfacing mixture shall be spread by means of a spreader box. However, when wheel path depressions have a cross section that is deformed 12.5 mm or more, the individual wheel paths shall first be filled utilizing a wheel path depression (rut) box.

101-1.05A – Spreader Box - The spreader box shall be capable of placing the microsurfacing a minimum of 3.6 m wide and shall prevent the loss of microsurfacing from the box. Spreader boxes over 2.38 m in application width shall have baffles, reversible motor driven augers or other suitable means to insure uniform application on superelevated sections and shoulder slopes. Spreader box skids shall be maintained in such manner as to prevent chatter (wash boarding) in the finished mat. The spreader box shall be clean and free of microsurfacing and MSE at the start of each work shift.

The spreader box shall have a series of strike-off devices at the rear of the box. The leading strike-off device shall be fabricated of steel, stiff rubber or other suitable material. The number of strike-off devices shall be determined by the Contractor. The first strike-off device shall be designed to maintain close contact with the pavement during the spreading operations, shall obtain the thickness required, and shall be capable of being adjusted to the various pavement cross sections for application of a uniform microsurfacing finished surface. The final strike-off device shall be fabricated of flexible material suitable for the intended use and shall be designed and operated to ensure that a uniform texture is achieved in the finished surface of the microsurfacing. The final strike-off device shall be cleaned daily and changed if problems with longitudinal scouring occur.

Flexible fabric drags attached to the rear of the spreader box shall not be used.

101-1.05B Wheel Path Depression (Rut) Box - The wheel path depression (rut) box shall be designed to have adjustable strike-off devices to regulate the depth and shall have a width of between 1.52 m and 1.81 m. Hydraulic augers, or similar devices, shall be installed and shall be capable of moving the mixed material from the rear to the front of the filling chamber. These devices shall also be capable of guiding the larger aggregate into the center, deeper section of the wheel path depression, and forcing the finer material toward the outer edges of the spreader box. In areas inaccessible to the wheel path depression (rut) box, the microsurfacing mixture may be spread by other methods approval by the Engineer.

101-1.06 Placing - The microsurfacing mixture shall be uniformly spread on the existing surfacing within the rate specified without spotting, rehandling, or otherwise shifting the mixture. The microsurfacing mixture shall not be placed when directed otherwise by the Engineer, when the ambient temperature is below 10°C, or during unsuitable weather. Microsurfacing shall not be placed if rain is imminent or if there is the possibility that there will be freezing temperatures within 24 hours.

When wheel path depressions have a cross section that is deformed 12.5 mm or more, the individual wheel paths shall first be filled utilizing a wheel path depression (rut) box. The depth of the wheel path depression shall be determined after adjacent ridges have been removed. The maximum single application for wheel path depressions shall be 25 mm. Wheel path depressions of depths greater than 25 mm shall require multiple applications in each depression.

Wheel path depression repair shall be constructed with a slight crown to allow for initial compaction by traffic on the microsurfacing.

Freshly filled wheel path depressions shall be compacted by traffic for a minimum of 12 hours before additional lifts of microsurfacing material are placed for rut filling purposes or as surface courses.

Prior to placement of the microsurfacing, the pavement markers shall be removed and the surface shall be cleaned by sweeping, flushing or other means necessary to remove loose particles of paving, dirt, and other extraneous material. When required by local conditions, the roadway surface may be fogged with water ahead of the spreader box. The application of the fog spray may be adjusted to suit temperatures, surface texture, humidity, and dryness of pavement.

Microsurfacing shall be spread at a rate within the following ranges of kilograms of dry aggregate per square meter.

Microsurfacing Type	Location	Spread Rate
Type II	Full Lane Width	5.5 – 11.0
Type III[1]	Full Lane Width	11.0 – 17.5
Type III[2]	Full Lane Width	16. 0 – 17.5

Notes:

1. For microsurfacing over asphalt concrete pavement.
2. For microsurfacing over portland cement concrete pavement and concrete bridge decks.

Longitudinal joints shall correspond with the edges of the final traffic lanes. The Engineer may permit other patterns of longitudinal joints if the patterns will not adversely affect the quality of the finished product.

Through traffic lanes shall be spread in full lane widths only. Longitudinal joints common to 2 traffic lanes shall be butt joints with overlaps not to exceed 76 mm. Building paper shall be placed at the transverse joints to avoid double placement of the microsurfacing. Other suitable methods to avoid double placement of the microsurfacing will be allowed. Hand tools shall be available to remove spillage.

The mixture shall be uniform and homogeneous after placing on the surfacing and shall not show separation of the MSE and aggregate after setting. The completed surface shall be of uniform texture and free from ruts, humps, depressions, or irregularities. Adequate means shall be provided to protect the microsurfacing from damage by traffic until such time that the mixture has cured sufficiently so that the microsurfacing will not adhere to or be picked up by the tires of vehicles.

The microsurfacing shall be swept approximately 24 hours after placement to remove loosened or shed aggregate particles. Thereafter, the microsurfacing shall be swept, when directed by the Engineer, for up to 10 days after placement to remove loosened or shed aggregate particles. Sweeping shall be performed in such a manner that the microsurfacing will not be damaged.

::ODMA\GRPWISE\COS.PW.PW_Library:58333.1

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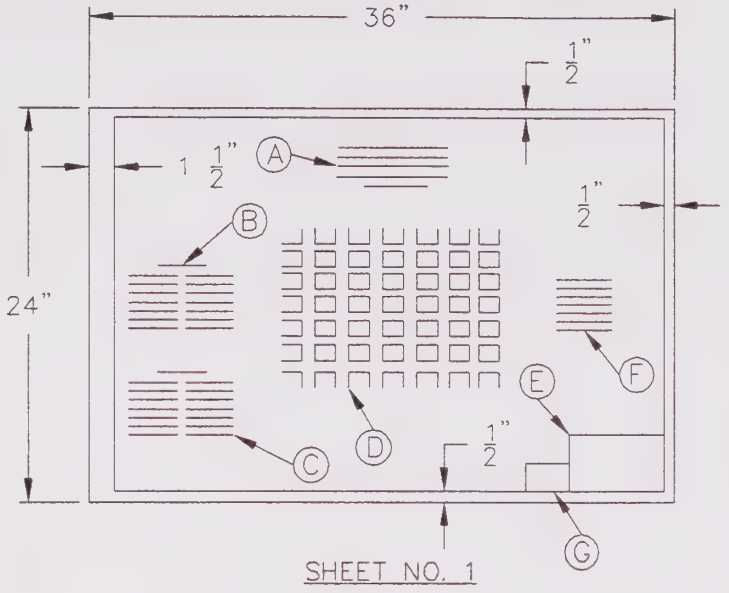
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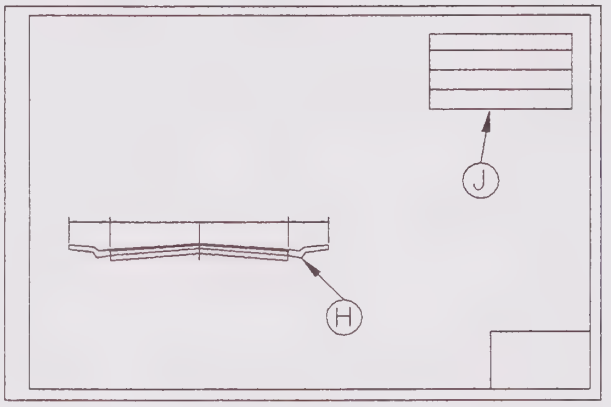
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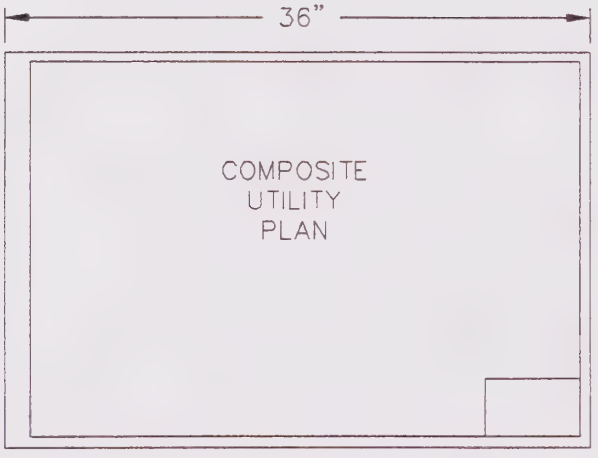


SHEET NO. 1

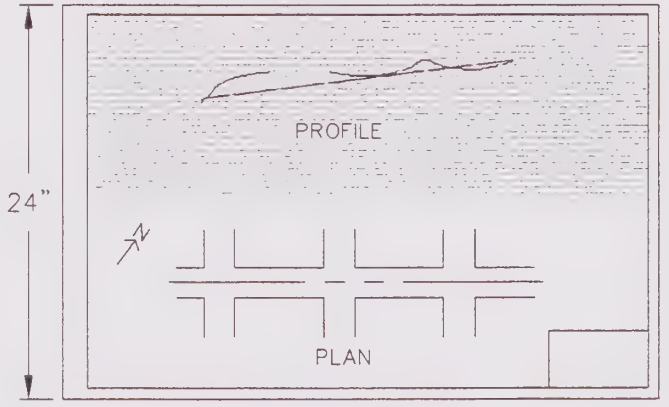


SHEET NO. 2

TYPICAL DETAILS AS REQUIRED



SHEET NO. 3



SHEET NO. 4

COMPOSITE UTILITY PLAN SHALL INCLUDE SANITARY SEWER, WATER, STORM DRAIN, AND MAINTENANCE HOLES. MAINTENANCE HOLE SHALL BE NUMBERED TO CORRESPOND WITH THE MAINTENANCE HOLE NUMBERS ON MASTER PLANS (PLAN VIEW OR PROFILE VIEW). SUBSEQUENT SHEETS AS NECESSARY, HORIZONTAL SCALE FOR PLAN & PROFILE TO BE 1"=20' TO 1"=60'. FOR INTERSECTIONS OTHER THAN 90°, DETAILS SHALL BE REQUIRED.

LEGEND

A. PROJECT TITLE
B. CONVENTIONAL SYMBOLS
C. ABBREVIATIONS
D. VICINITY MAP
E. TITLE BLOCK
F. INDEX OF SHEETS
G. CONCURRENCE BY OTHER DEPARTMENTS
H. TYPICAL CROSS SECTIONS
J. PAVEMENT THICKNESS TABLE FOR ALL STREETS WITHIN PROJECT

NOTES:

1. 8-1/2" x 11" DRAWINGS MAY BE USED FOR SKETCHES AND DETAILS ON SMALL PROJECTS WHEN APPROVED BY THE ENGINEER.
2. BORDER AND TITLE BLOCK TO BE CITY OF STOCKTON STANDARD FOR 8-1/2" x 11" SHEET AS PER STANDARD DRAWING NO. 1A.
3. FOR TITLE BLOCK DETAILS, SEE DRAWING NO. 2.
4. SUBDIVISION PLANS SHALL INCLUDE A GRADING PLAN.
5. TRAFFIC DRAWINGS, IF REQUIRED, SHALL BE LOCATED AT THE END OF THE IMPROVEMENT PLAN.
6. 22" x 34" DRAWING SHEET ALLOWED SUBJECT TO CITY ENGINEER APPROVAL.

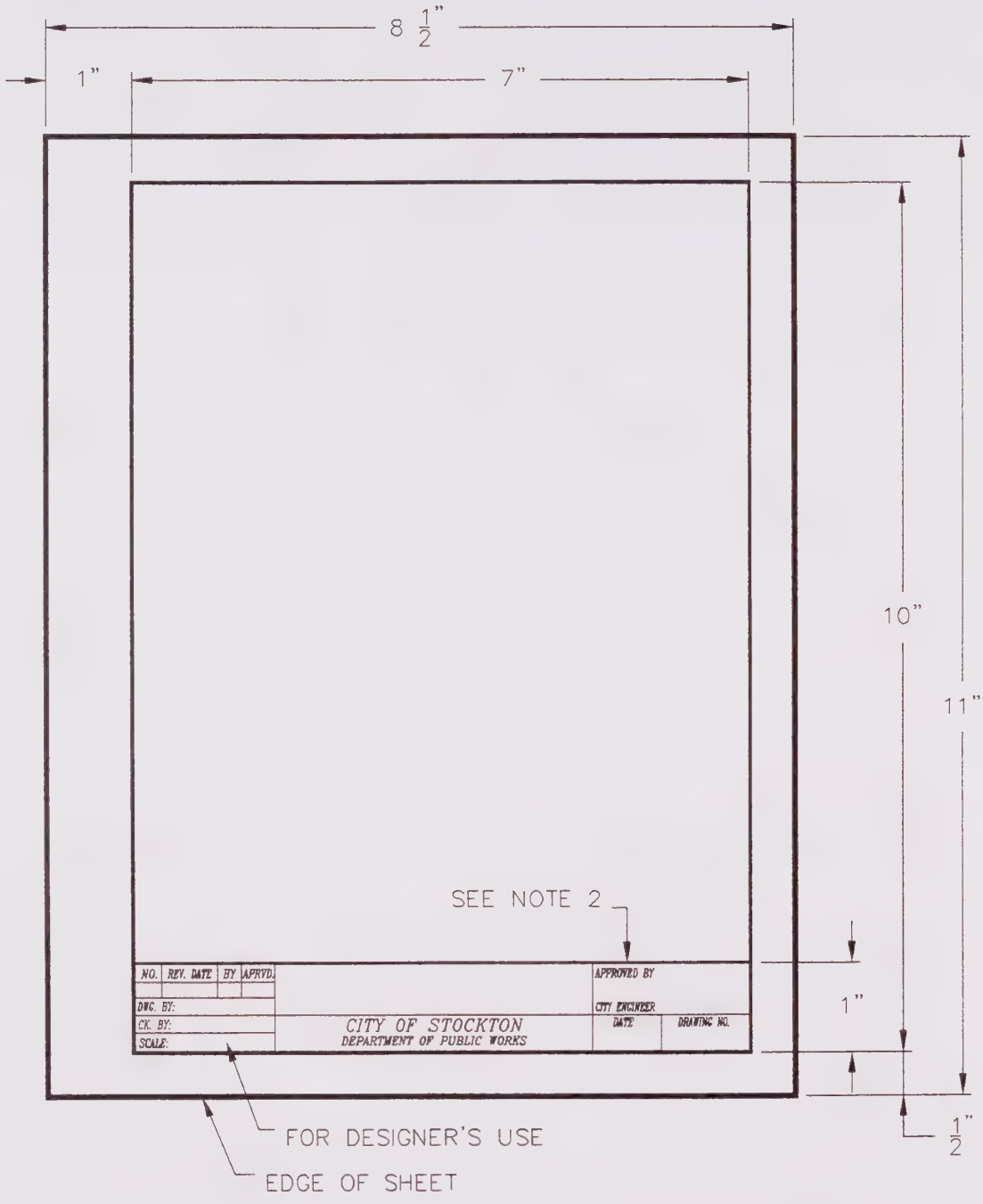
REV. NO.	REV. DATE	REV. BY
5	6/1/2003	HL/EA
DIGITIZED	7/1/91	
DWG. BY DE	SCALE	
CK. BY	NONE	

TYPICAL LAYOUT FOR IMPROVEMENT PLANS

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 11/25/03

SUPERCEDES DWG. DATED	DRAWING NO.
01/09/02	1

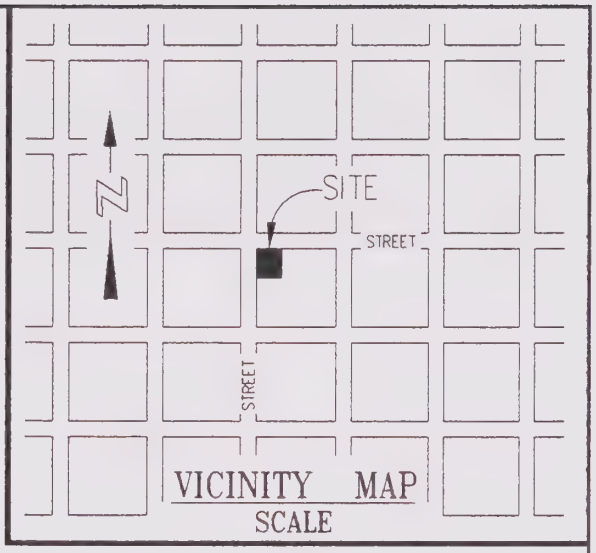


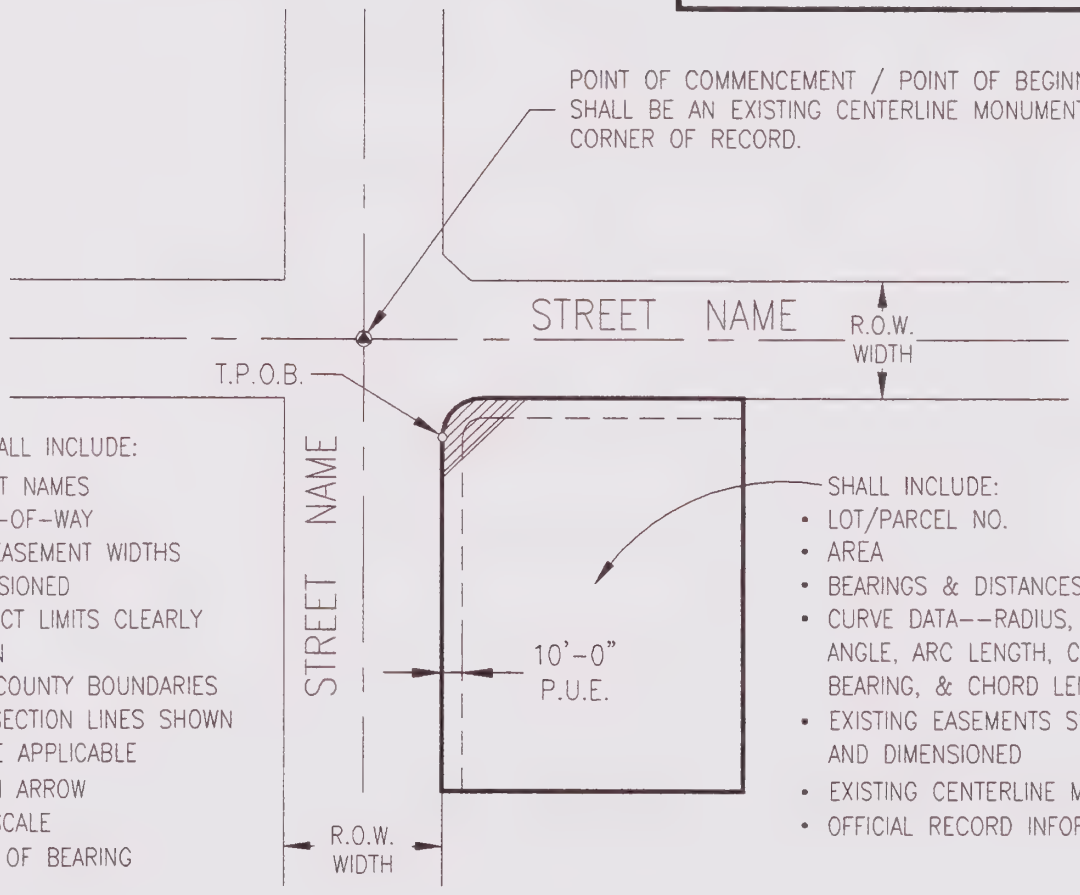
NOTES:

1) UPON REQUEST, CITY WILL FURNISH A BLANK SAMPLE.
2) ON CITY OF STOCKTON STANDARD DRAWINGS, ONE OF THE FOLLOWING WILL BE INSERTED TO INDICATE THE ACTION TAKEN:

   A) NEW DRAWING
   B) REVISION
   C) DIGITIZED VERSION

REV. NO.	REV. DATE	REV. BY	CITY OF STOCKTON STANDARD BORDER AND TITLE BLOCK FOR 8-1/2" x 11" SHEET	REVISION APPROVED BY CITY ENGINEER Finbar J. O'Regan DATE: 01/09/02	
1	7/1/94	KB/DE			
DIGITIZED	7/1/91				
DWG. BY DE		SCALE	CITY OF STOCKTON DEPARTMENT OF PUBLIC WORKS	SUPERCEDES DWG. DATED	DRAWING NO. 1A
CK. BY		NONE			





MAP SHALL INCLUDE:

- STREET NAMES
- RIGHT-OF-WAY AND EASEMENT WIDTHS DIMENSIONED
- PROJECT LIMITS CLEARLY SHOWN
- CITY-COUNTY BOUNDARIES AND SECTION LINES SHOWN WHERE APPLICABLE
- NORTH ARROW AND SCALE
- BASIS OF BEARING

SHALL INCLUDE:

- LOT/PARCEL NO.
- AREA
- BEARINGS & DISTANCES
- CURVE DATA--RADIUS, CENTRAL ANGLE, ARC LENGTH, CHORD BEARING, & CHORD LENGTH
- EXISTING EASEMENTS SHOWN AND DIMENSIONED
- EXISTING CENTERLINE MONUMENTS
- OFFICIAL RECORD INFORMATION

NOTES:

1. DRAFTING STANDARDS AND SYMBOLS SHALL CONFORM TO CITY OF STOCKTON STANDARDS.
2. CLOSURE CALCULATIONS, INCLUDING AREA AND PRECISION, SHALL BE SUBMITTED SEPARATELY.
3. LEGAL DESCRIPTIONS SUBMITTED WITH THE MAP SHALL BE STAMPED AND SIGNED BY A REGISTERED PROFESSIONAL ENGINEER OR LICENSED LAND SURVEYOR.

PREPARED BY:

(ENGINEERING FIRM)

REV. NO.	REV. DATE	REV. BY
2	6/1/2000	HLE/RH
DIGITIZED	6/1/94	
DWG. BY	DE	SCALE
CK. BY		NONE

CITY OF STOCKTON STANDARD MAP ASSOCIATED WITH LEGAL DESCRIPTION FOR 8-1/2" x 11" SHEET

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

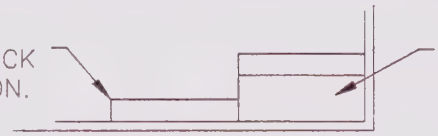
REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 01/09/02

SUPERCEDES DWG. DATED 12/29/93

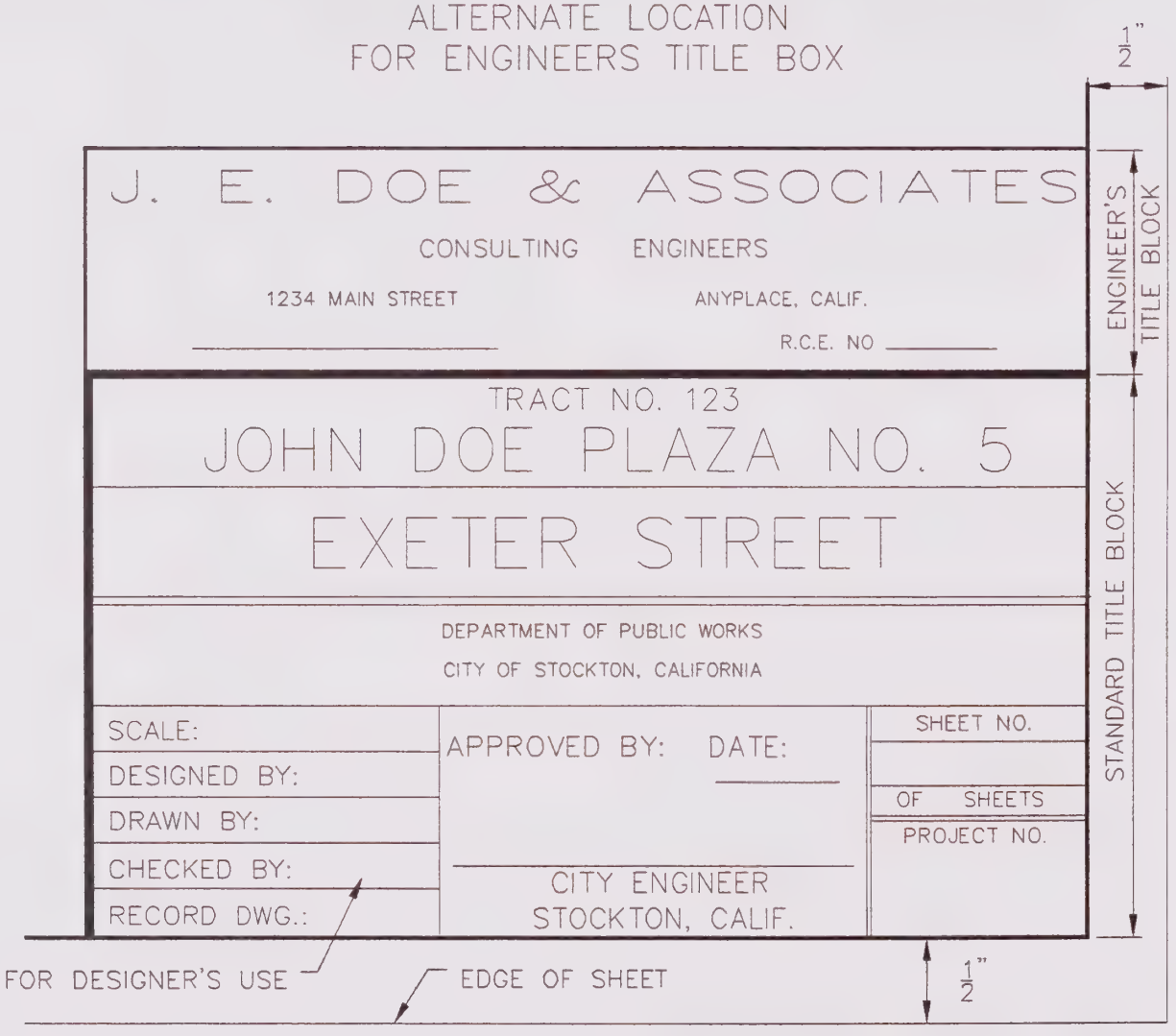
DRAWING NO. 1B

NOTE:

TITLE SHEET SHALL BE STAMPED AND SIGNED BY A REGISTERED ENGINEER ADJACENT TO THE TITLE BLOCK.



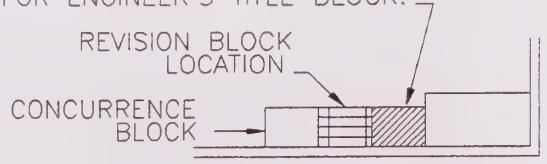
ALTERNATE LOCATION
FOR ENGINEERS TITLE BOX



Revision No.	Description	Date	By	Aprvd. By
1				

REVISION BLOCK

ALTERNATE LOCATION OF REVISION BLOCK IF NOT USED FOR ENGINEER'S TITLE BLOCK.



REVISION BLOCK LOCATION

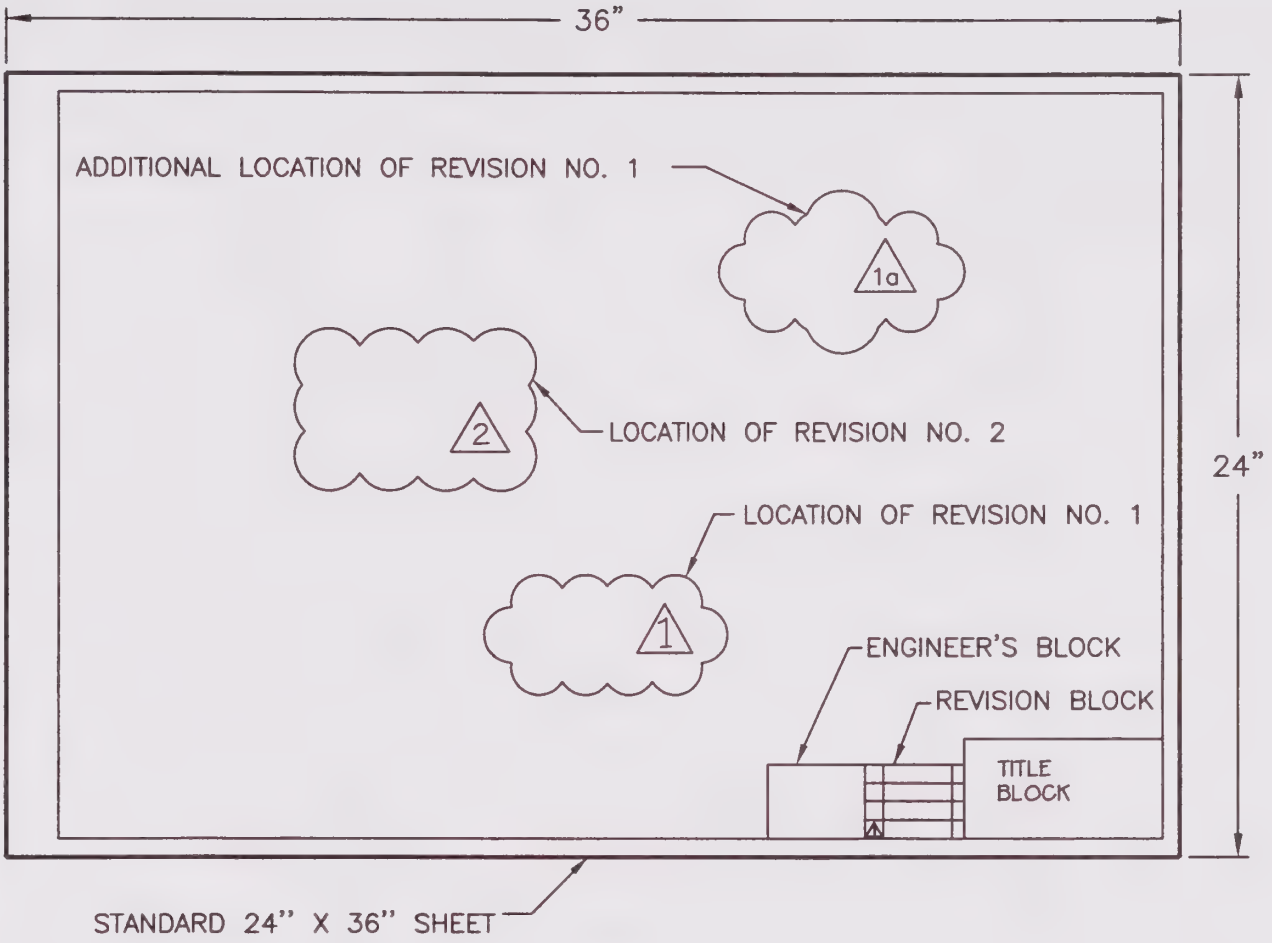
REV. NO.	REV. DATE	REV. BY
2	7/1/92	KB/DE
DIGITIZED	7/1/91	
DWG. BY	RC	SCALE
CK. BY		NONE

TITLE BLOCK

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

DIGITIZED VERSION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 01/09/02

SUPERCEDES DWG. DATED	DRAWING NO.
11/7/80	2



NOTES:

1. EACH DESIGN REVISION SHALL BE NUMBERED CONSECUTIVELY WITH THE NUMBER PLACED IN A TRIANGLE THUS: △1 AND DESCRIBED IN THE REVISION BLOCK. (SEE DWG. NO. 2) REVISIONS TO BEGIN AT BOTTOM OF REVISION BLOCK AND PROGRESS UPWARD.
2. FOR LOCATION OF THE RELATED REVISION, A "CLOUD", i.e. ☁ ,SHALL BE PLACED AROUND THE ITEM(S) TO BE REVISED. A REVISION TRIANGLE (NOTE 1) SHALL BE PLACED WITHIN THE CLOUD TO IDENTIFY THE REVISION NUMBER, i.e. ☁△1 . (SEE EXAMPLES ABOVE)
3. WHEN A REVISION APPEARS AT MORE THAN ONE PLACE ON A SHEET, LETTERS SHALL BE USED IN ADDITION TO THE NUMBERS IN ORDER TO ACCURATELY DETERMINE THE SPECIFIC LOCATION OF EACH IDENTICAL CHANGE. (SEE EXAMPLE ABOVE).

REV. NO.	REV. DATE	REV. BY	DESIGN REVISION FORMAT	REVISION APPROVED BY CITY ENGINEER
2	6/1/94	KB		Finbarr J. O'Regan
DIGITIZED	7/1/90			DATE: 11/25/03
DWG. BY RC	SCALE		CITY OF STOCKTON	SUPERCEDES DWG. DATED 11/7/80 / DRAWING NO. 3
CK. BY	NONE		DEPARTMENT OF PUBLIC WORKS	

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DRAFTING STANDARDS

ALL SUBDIVISION PLANS, CONSTRUCTION DRAWINGS, & PROPERTY PLATS SUBMITTED TO THE CITY ENGINEER FOR CONSIDERATION SHALL CONFORM TO AND BE PREPARED IN ACCORDANCE WITH THE FOLLOWING STANDARDS:

1. **ALL LETTERING**, OTHER THAN THAT HEREIN SPECIFIED OR SHOWN BELOW, SHALL BE A MINIMUM OF 0.100 INCH IN HEIGHT AND USING 0.01" LINE WIDTH, OR EQUAL.

2. **SUBDIVISION PLANS**

	LINE WIDTH
STREET CENTER LINES	0.01" WIDTH
RADIAL BEARING LINES	0.01" WIDTH
EASEMENT LINES	0.01" WIDTH
LOT LINES	0.02" WIDTH
RIGHT-OF-WAY LINES	0.03" WIDTH
BLOCK OUTLINE	0.03" WIDTH
SUBDIVISION OUTLINE	0.04" WIDTH
MONUMENTS SET	
MONUMENTS SET IN MONUMENT BOX	
MONUMENTS FOUND	
MONUMENTS FOUND IN MONUMENT BOX	
BENCH MARK ELEVATION	
STREET NAMES — NAME	LETTERS 0.175" HIGH AND 0.04" LINE WIDTH
LOT NUMBERS — 36	LETTERS 0.175" HIGH AND 0.02" LINE WIDTH
BEARINGS, DISTANCES, CURVE DATA, COORDINATES, ETC.	LETTERS 0.100" HIGH AND 0.01" LINE WIDTH
ADJACENT SUBDIVISIONS	LETTERS 0.175" HIGH AND SHADOW LETTERING AND 0.01" LINE WIDTH
ADJACENT LOT NUMBERS	LETTERS 0.175" HIGH AND DOTTED LETTERING AND 0.01" LINE WIDTH

TITLE BLOCK AND OTHER RELATED LETTERING SHALL BE IN ACCORDANCE WITH STANDARD ACCEPTED ENGINEERING PRACTICE, BUT IN NO CASE SHALL THE LETTERING BE LESS THAN 0.100 INCH IN HEIGHT AND USING LINE WIDTH OF 0.01".

3. **IMPROVEMENT PLANS**

DESCRIPTION	PROPOSED	EXISTING
SANITARY SEWER	— 6" SS —	--- 6" SS ---
STORM SEWER (AKA STORM DRAIN)	— 8" SD —	--- 8" SD ---
GAS LINE	— 4" G —	--- 4" G ---
WATER LINE	— 8" W —	--- 8" W ---
TELEPHONE	— T —	---- T -----
CABLE TELEVISION	— TV —	----TV -----
GAS VALVE	— G —	---- G -----
WATER VALVE	— W —	---- W -----
ELECTRICAL CONDUIT	— E —	---- E -----
MATCH LINE	STA. 5+00	

REV. NO.	REV. DATE	REV. BY
2	6/1/2000	HLE/RH
DIGITIZED	7/1/92	
DWG. BY: RC	SCALE: NONE	
CK. BY:		

DRAFTING STANDARDS

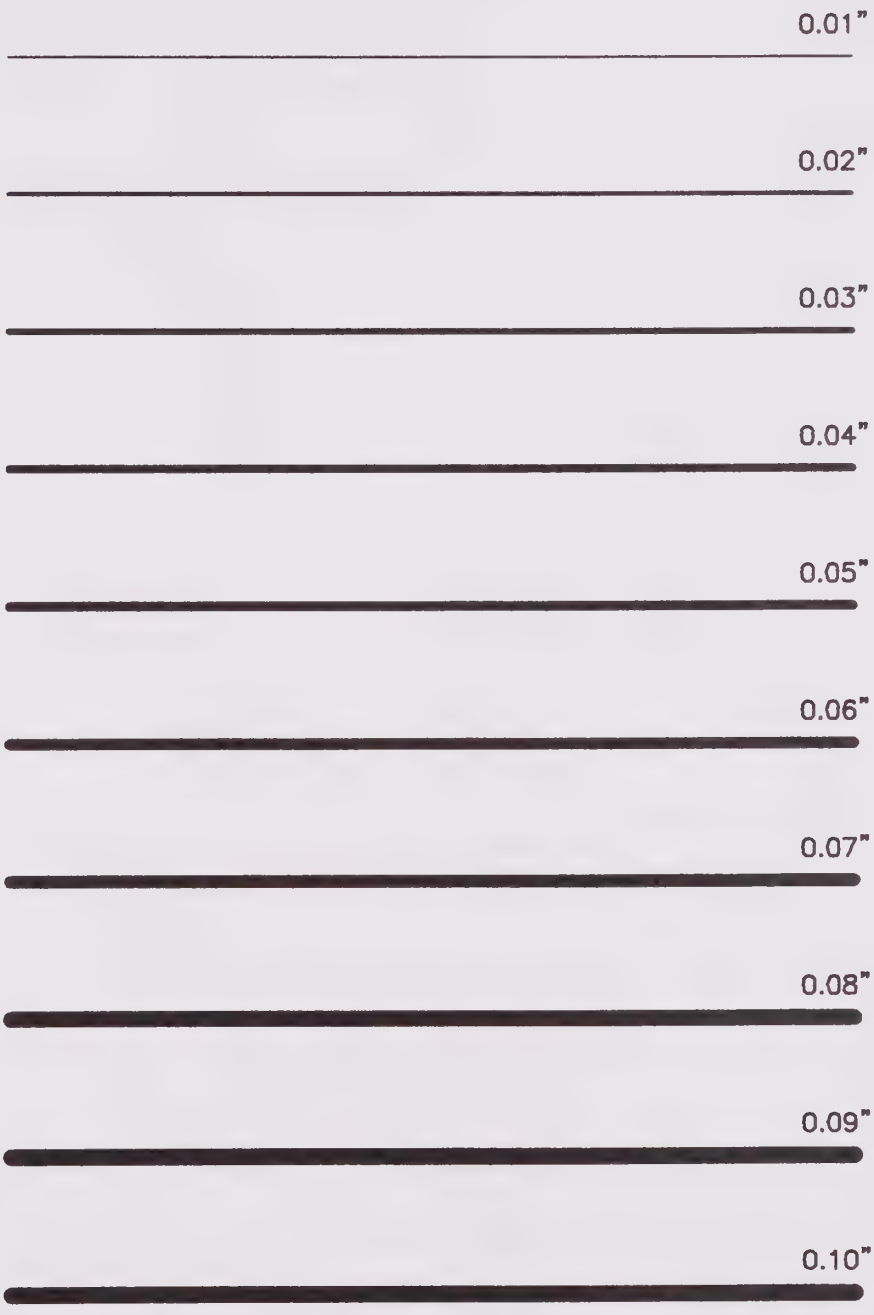
CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 01/09/02

SUPERCEDES DWG. DATED 2/23/95

DRAWING NO. 3A

LINE WIDTH



REV. NO.	REV. DATE	REV. BY
2	6/1/2003	HL/EA
DIGITIZED	6/1/2000	
DWG. BY HLE	SCALE	
CK. BY	1:1	

DRAFTING STANDARDS

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

NEW DRAWING APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 11/25/03

SUPERCEDES DWG. DATED	DRAWING NO.
01/09/02	3A-1

IMPROVEMENT PLANS (CONT'D FROM DWG. 3A)

DESCRIPTION	TO BE CONSTRUCTED	EXISTING
MAINTENANCE HOLE		
CATCHBASIN		
GAS METER	G	G
WATER METER	W	W
CURB AND GUTTER		
SIDEWALK		
DRIVEWAY		
CONFORM PAVEMENT		
FIRE HYDRANT		
SIGN		
SANITARY SEWER CLEANOUT		
UTILITY POLE		
GUARD RAIL		
BARRICADE		
FENCE		
RAILROAD		
WHEELCHAIR RAMP		
SANITARY SEWER SERVICE	'TEE' CONNECTION	
LAMPHOLE		
TRAFFIC SIGNAL		
ELECTRICAL TRANSFORMER		
POWER SOURCE	PS	PS
BLOW-OFF		

THE FOREGOING SYMBOLS SHALL BE USED IN CONNECTION WITH ALL IMPROVEMENTS AND CONTRACT PLANS.

ANY ABBREVIATIONS USED SHALL CONFORM TO THE STANDARD ABBREVIATIONS AS SET FORTH IN SECTION 1-1.03 OF THE CITY OF STOCKTON STANDARD SPECIFICATIONS.

REV. NO.	REV. DATE	REV. BY
2	6/1/2000	HLE/RH
DIGITIZED	7/1/92	
DWG. BY	RC	SCALE
CK. BY		NONE

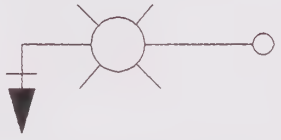
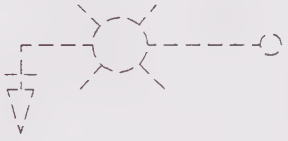
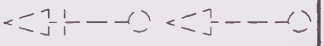
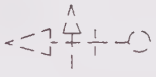
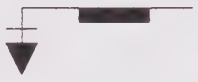
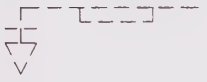
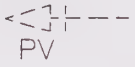
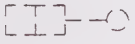
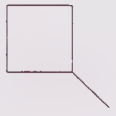
DRAFTING STANDARDS

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 01/09/02

SUPERCEDES DWG. DATED	DRAWING NO.
6/1/94	3B

IMPROVEMENT PLANS (CONT'D FROM DWG. 3B)

DESCRIPTION	TO BE CONSTRUCTED	EXISTING
PULL BOX		
PULL BOX WITH DETECTOR STUB IN CONDUIT		
ELECTROLIER		
COMBINATION TRAFFIC SIGNAL WITH BACKPLATE & LUMINAIRE		
VEHICLE SIGNAL WITH AND WITHOUT BACKPLATE		
COMBINATION TRAFFIC SIGNAL, GREEN ARROW WITH BACKPLATE		
MASTARM SIGNAL WITH STREET NAME SIGN		
PROGRAMMED VISIBILITY HEAD WITH BACKPLATE	 PV	 PV
PEDESTRIAN SIGNAL FACE		
PEDESTRIAN PUSH BUTTON AND ASSOCIATED VEHICLE PHASE	PPB ø6	PPB ø6
INDUCTIVE DETECTOR LOOP		
TRAFFIC SIGNAL CONTROLLER CABINET WITH DOOR SWING AS SHOWN		
TYPE III OR III M SERVICE CABINET WITH DOOR SWING AS SHOWN		

REV. NO.	REV. DATE	REV. BY
1	6/1/94	KB
DIGITIZED	7/1/92	
DWG. BY	RC	SCALE
CK. BY		NONE

DRAFTING STANDARDS

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 01/09/02

SUPERCEDES DWG. DATED 7/1/84

DRAWING NO. 3C

PROGRESS SCHEDULE – CITY OF STOCKTON – DEPT. OF PUBLIC WORKS

JOB _____

REPORTING DATE: _____
% COMPLETE _____
% TIME ELAPSED _____
TIME LIMIT _____ WORKING DAYS

SUBMITTED IN ACCORDANCE WITH THE REQUIREMENTS
OF THE SPECIAL PROVISIONS _____ DATE
_____ CONTRACTOR
BY: _____
ACCEPTED: _____ DATE: _____

ACTUAL PROGRESS
SCHEDULED PROGRESS
% COMPLETE OF EACH ITEM AS
SUBMITTED BY CONTRACTOR.

ITEM NO.	ITEM	% OF BID	WORKING DAYS 5 10 15 20 25 30 35 40 45 50

TYPICAL PROGRESS SCHEDULE CHART

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

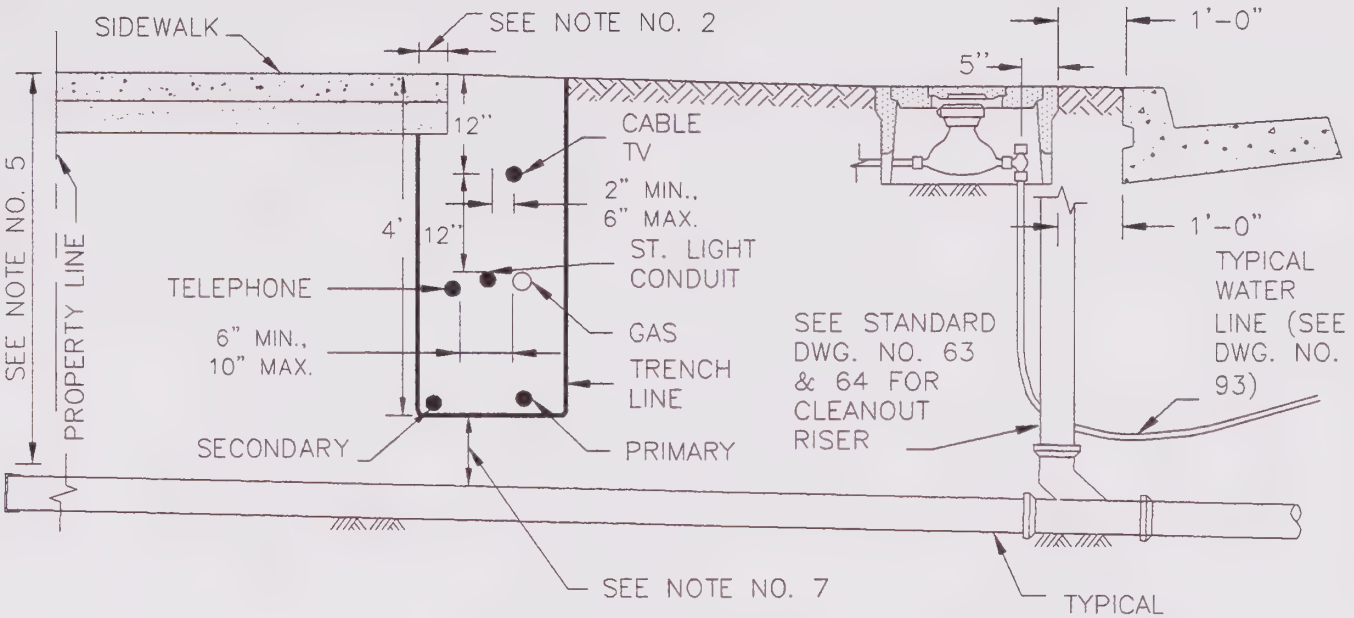
REV. NO.	REV. DATE	REV. BY

DIGITIZED 7/1/92
DWG. BY RC
CK. BY
SCALE NONE

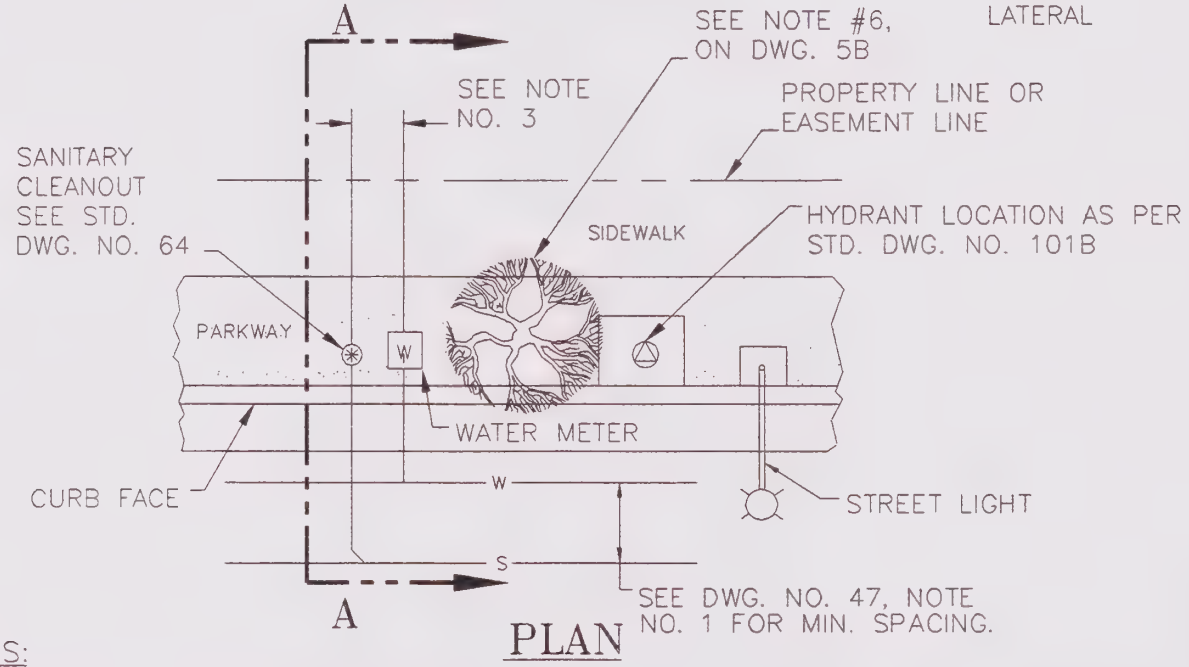
REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 01/09/02

SUPERCEDES DWG. DATED 11/7/80

DRAWING NO. 4



A-A SECTION



PLAN

NOTES:

1. ● DENOTES CABLE AND/OR CONDUIT.
2. IF THE TRENCH LIES MORE THAN 9" UNDER THE SIDEWALK IT SHALL BE BACK FILLED IN THE SAME MANNER AS THE TOP 3'-0" OF A TRENCH SECTION IN EXISTING STREETS. SEE STANDARD DWG. NO. 50
3. WATER SERVICE AND SANITARY SERVICE SHALL HAVE A MINIMUM LATERAL CLEARANCE OF 2'-6".
4. UTILITIES TO BE PLACED AS PER PUBLIC UTILITY COMPANY REGULATIONS.
5. SANITARY HOUSE LATERAL SHALL HAVE 4'-6" MIN. AND 7'-0" MAX. COVER AT PROPERTY LINE.
6. GAS LINE LOCATION TO BE DETERMINED BY DEVELOPER AND P.G.&E. COMPANY.
7. ALL SERVICES CROSSING UNDERNEATH PRIMARY AND SECONDARY ELECTRICAL LINES SHALL HAVE A MINIMUM CLEARANCE OF 6". ELECTRICAL LINES SHALL HAVE A CLEARANCE OF 12" IF PLACED BELOW SERVICE LATERALS.
8. FOR ALTERNATE LOCATIONS, SEE DWG. NO. 5B, 5C.

REV. NO.	REV. DATE	REV. BY
4	6/1/2003	HL/EA
DIGITIZED	7/1/91	
DWG. BY RC	SCALE	
CK. BY	NONE	

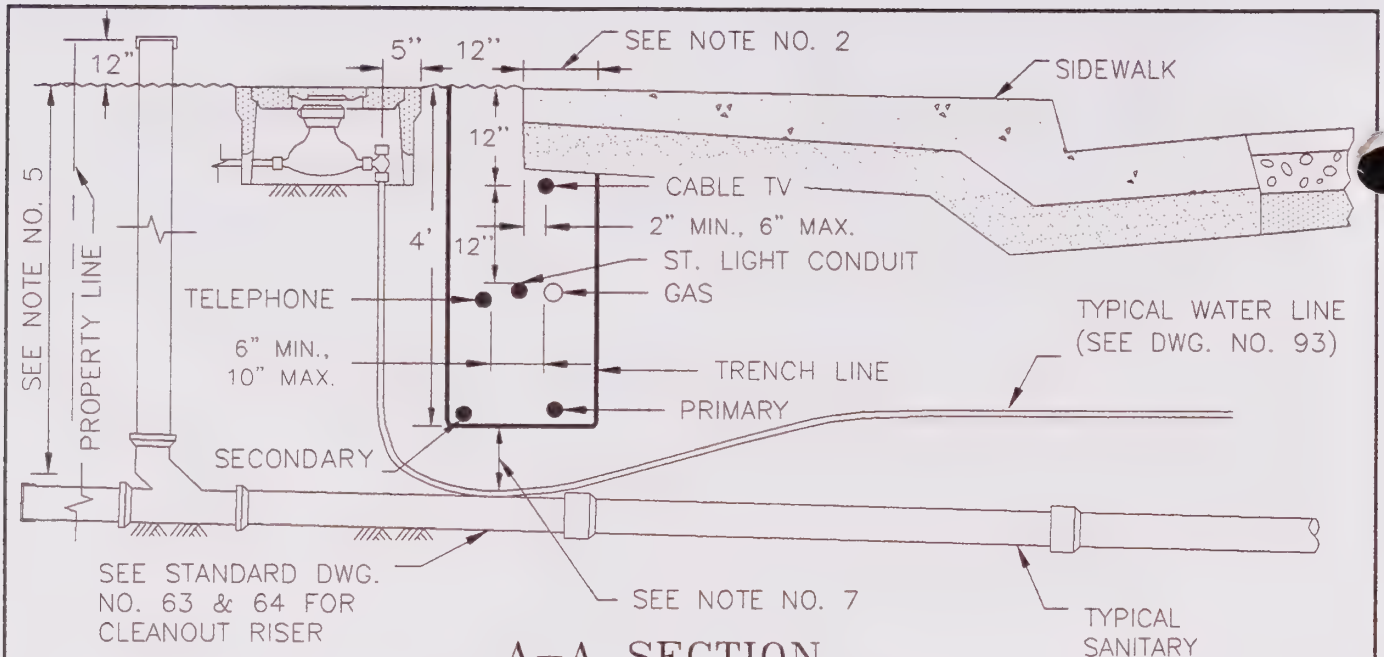
UNDERGROUND UTILITY LOCATIONS
CASE 1 - C,G, & SW WITH PLANTER STRIP

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

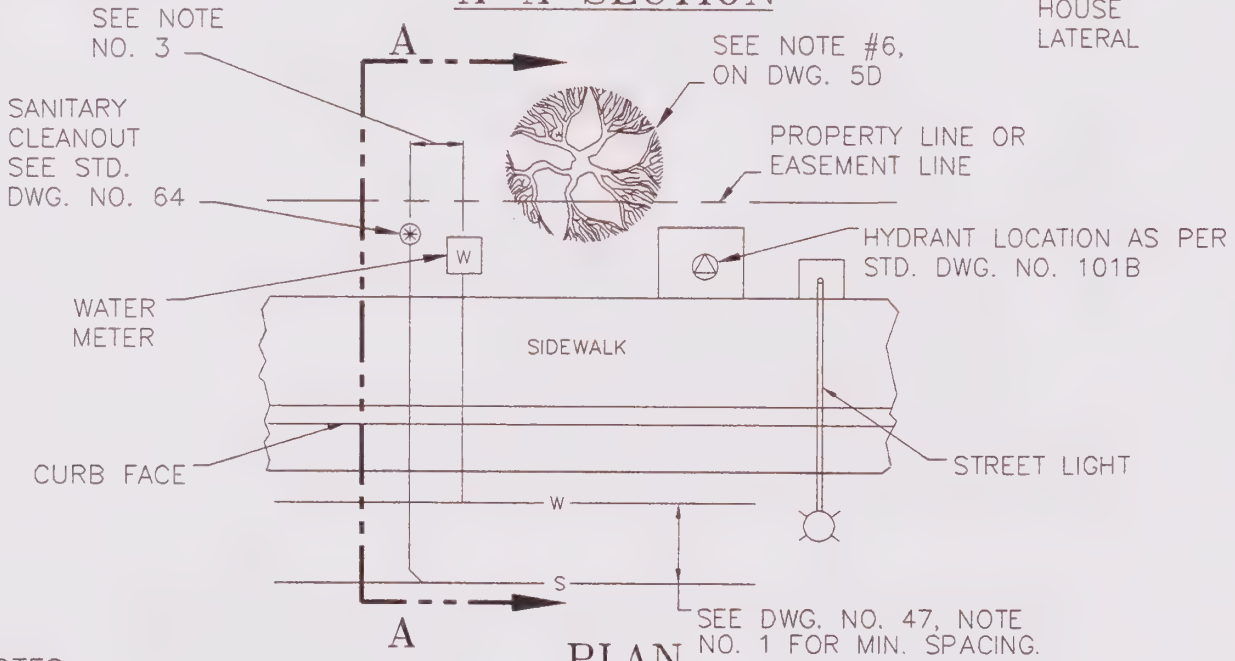
REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 11/25/03

SUPERCEDES DWG. DATED 01/09/02

DRAWING NO. 5



A-A SECTION



PLAN

NOTES:

1. ● DENOTES CABLE AND/OR CONDUIT.
2. IF THE TRENCH LIES MORE THAN 9" UNDER THE SIDEWALK IT SHALL BE BACK FILLED IN THE SAME MANNER AS THE TOP 3'-0" OF A TRENCH SECTION IN EXISTING STREETS. SEE STANDARD DWG. NO. 50
3. WATER SERVICE AND SANITARY SERVICE SHALL HAVE A MINIMUM LATERAL CLEARANCE OF 2'-6".
4. UTILITIES TO BE PLACED AS PER PUBLIC UTILITY COMPANY REGULATIONS.
5. SANITARY HOUSE LATERAL SHALL HAVE 4'-6" MIN. AND 7'-0" MAX. COVER AT PROPERTY LINE.
6. GAS LINE LOCATION TO BE DETERMINED BY DEVELOPER AND P.G.&E. COMPANY.
7. ALL SERVICES CROSSING UNDERNEATH PRIMARY AND SECONDARY ELECTRICAL LINES SHALL HAVE A MINIMUM CLEARANCE OF 6". ELECTRICAL LINES SHALL HAVE A CLEARANCE OF 12" IF PLACED BELOW SERVICE LATERALS.
8. FOR ALTERNATE LOCATIONS, SEE DWG. NO. 5D,5E.

REV. NO.	REV. DATE	REV. BY
4	6/1/2003	HL/EA
DIGITIZED	7/1/91	
DWG. BY	RC	SCALE
CK. BY		NONE

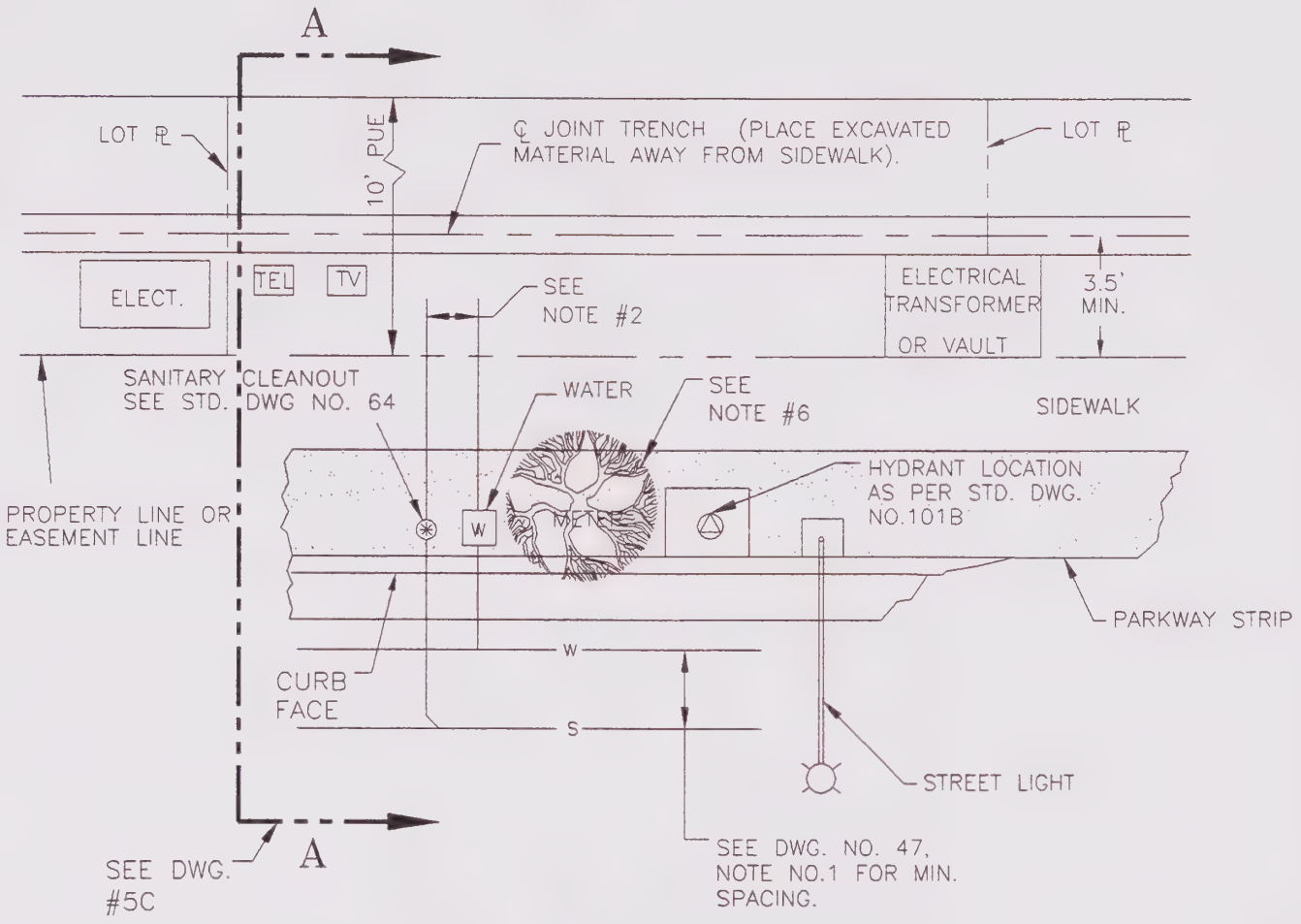
UNDERGROUND UTILITY LOCATIONS
CASE 2 - C,G, & SW WITH NO PLANTER STRIP

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 11/25/03

SUPERCEDES DWG. DATED 01/09/02

DRAWING NO. 5A



PLAN

NOTES:

1. ◍ DENOTES CABLE AND/OR CONDUIT.
2. WATER SERVICE AND SANITARY SERVICE SHALL HAVE LATERAL CLEARANCE OF 2'–6" MIN.
3. UTILITIES TO BE PLACED AS PER PUBLIC UTILITY COMPANY REGULATIONS.
4. GAS LINE LOCATION TO BE DETERMINED BY THE DEVELOPER AND P.G.&E. CO.
5. THIS PLAN SHALL BE USED ONLY WITH THE APPROVAL OF THE CITY ENGINEER.
6. TREE (TO BE PLANTED BY CITY OR BY PERMIT) REQUIRES 6'–0" LATERAL CLEARANCE FROM CONCRETE DRIVE, SIDEWALK, SEWER, GAS AND WATER, LOCATE UTILITIES ACCORDINGLY. SEE ALSO DRAWING NO. 5F.

REV. NO.	REV. DATE	REV. BY
4	6/1/2003	HL/EA
DIGITIZED	7/1/91	
DWG. BY	RC	SCALE
CK. BY		NONE

ALTERNATE UNDERGROUND UTILITY LOCATIONS
CASE 1 – C,G, & SW WITH PLANTER STRIP

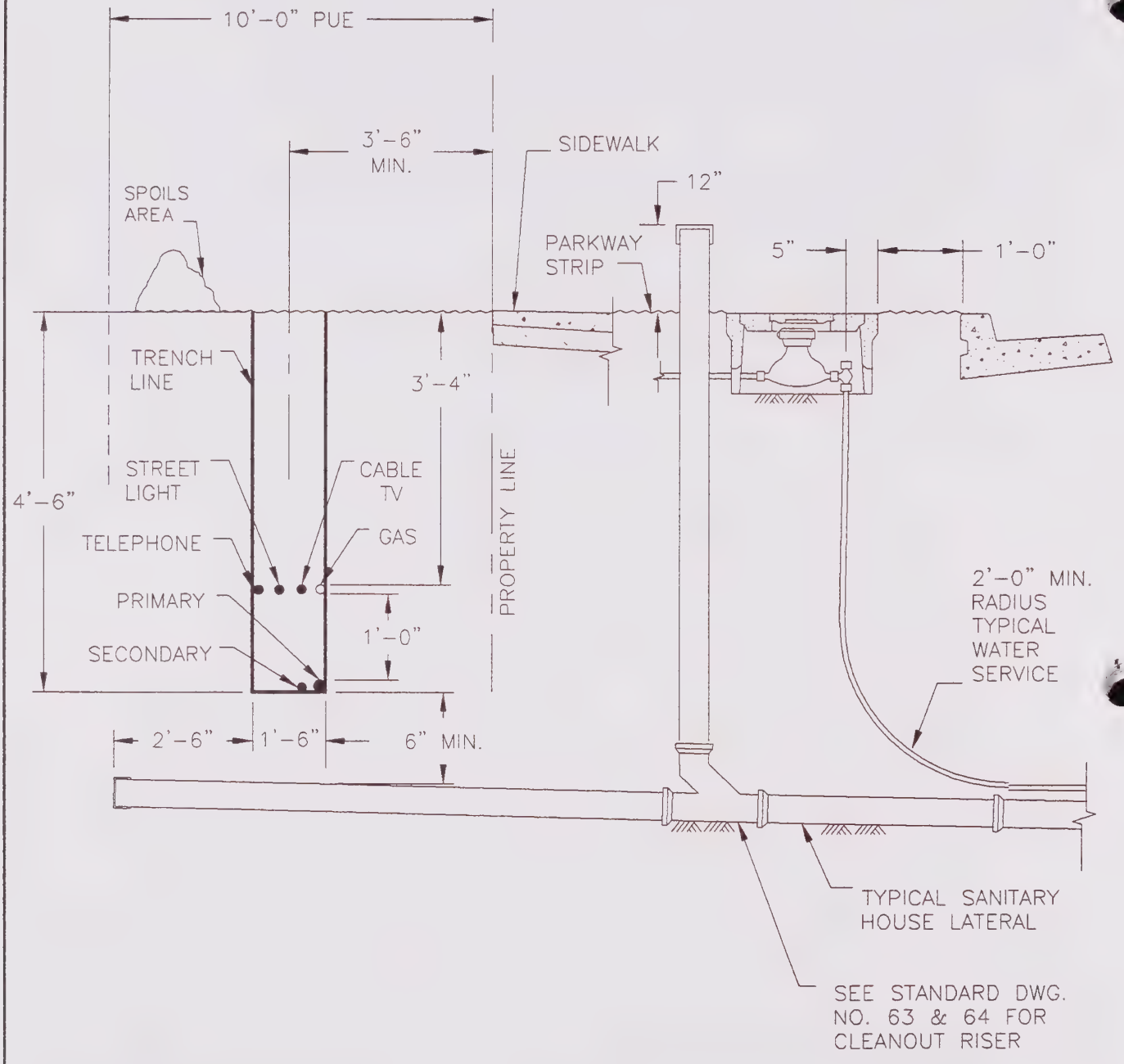
CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 11/25/03

SUPERCEDES DWG. DATED 01/09/02

DRAWING NO. 5B

(CONT'D FROM DWG. 5B)



A-A SECTION

REV. NO.	REV. DATE	REV. BY
4	6/1/2003	HL/EA
DIGITIZED	7/1/91	
DWG. BY RC	SCALE	
CK. BY	NONE	

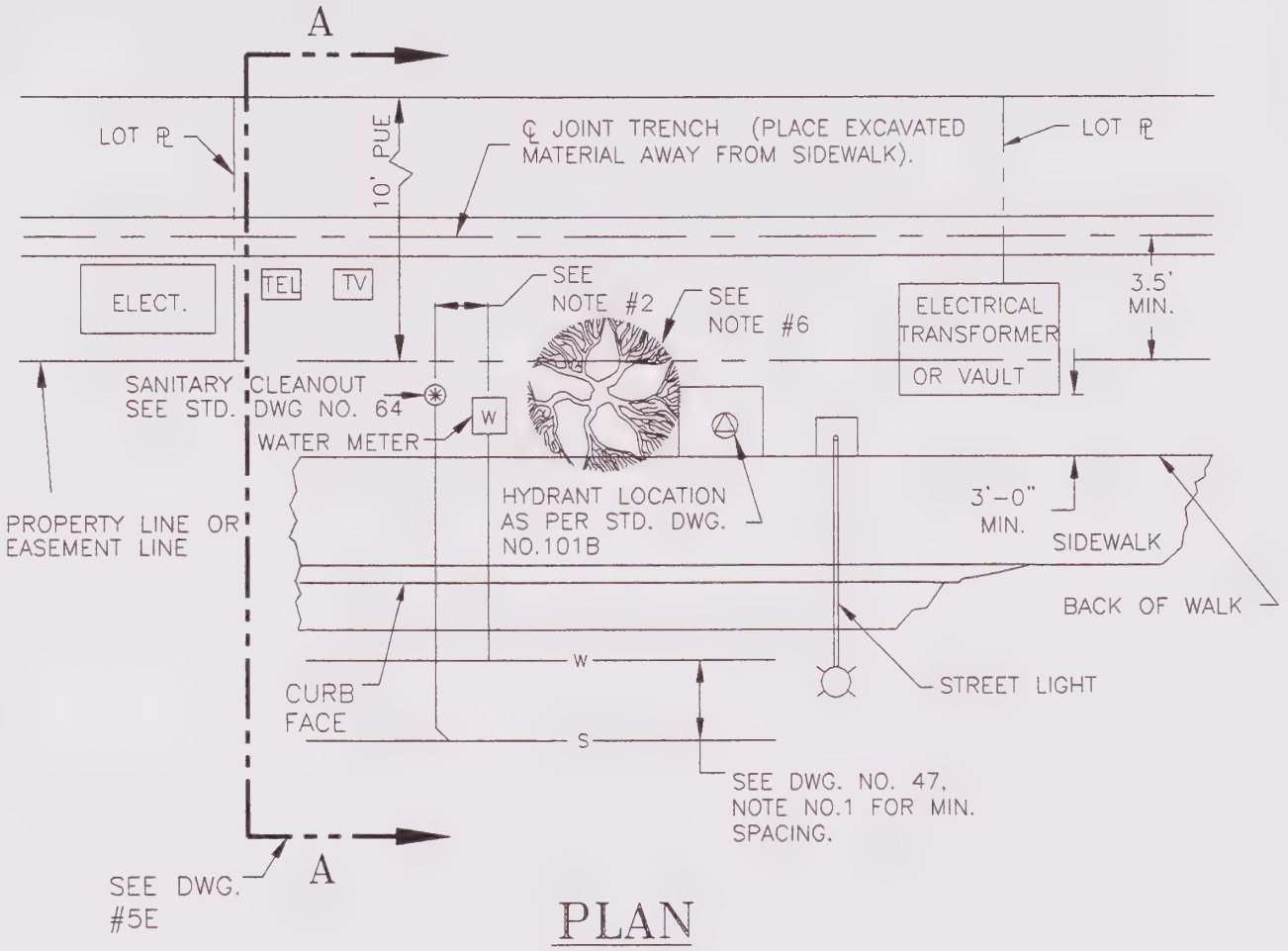
ALTERNATE UNDERGROUND UTILITY LOCATIONS
CASE 1 - C,G, & SW WITH PLANTER STRIP

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 11/25/03

SUPERCEDES DWG. DATED 2/23/95

DRAWING NO. 5C



PLAN

NOTES:

1. ▨ DENOTES CABLE AND/OR CONDUIT.
2. WATER SERVICE AND SANITARY SERVICE SHALL HAVE LATERAL CLEARANCE OF 2'-6" MIN.
3. UTILITIES TO BE PLACED AS PER PUBLIC UTILITY COMPANY REGULATIONS.
4. GAS LINE LOCATION TO BE DETERMINED BY THE DEVELOPER AND P.G.&E. CO.
5. THIS PLAN SHALL BE USED ONLY WITH THE APPROVAL OF THE CITY ENGINEER.
6. TREE (TO BE PLANTED BY CITY OR BY PERMIT) REQUIRES 6'-0" LATERAL CLEARANCE FROM CONCRETE DRIVE, SIDEWALK, SEWER, GAS AND WATER, LOCATE UTILITIES ACCORDINGLY. SEE ALSO DRAWING NO. 5F.

REV. NO.	REV. DATE	REV. BY
4	6/1/2003	HL/EA
DIGITIZED	7/1/91	
DWG. BY	RC	SCALE
CK. BY		NONE

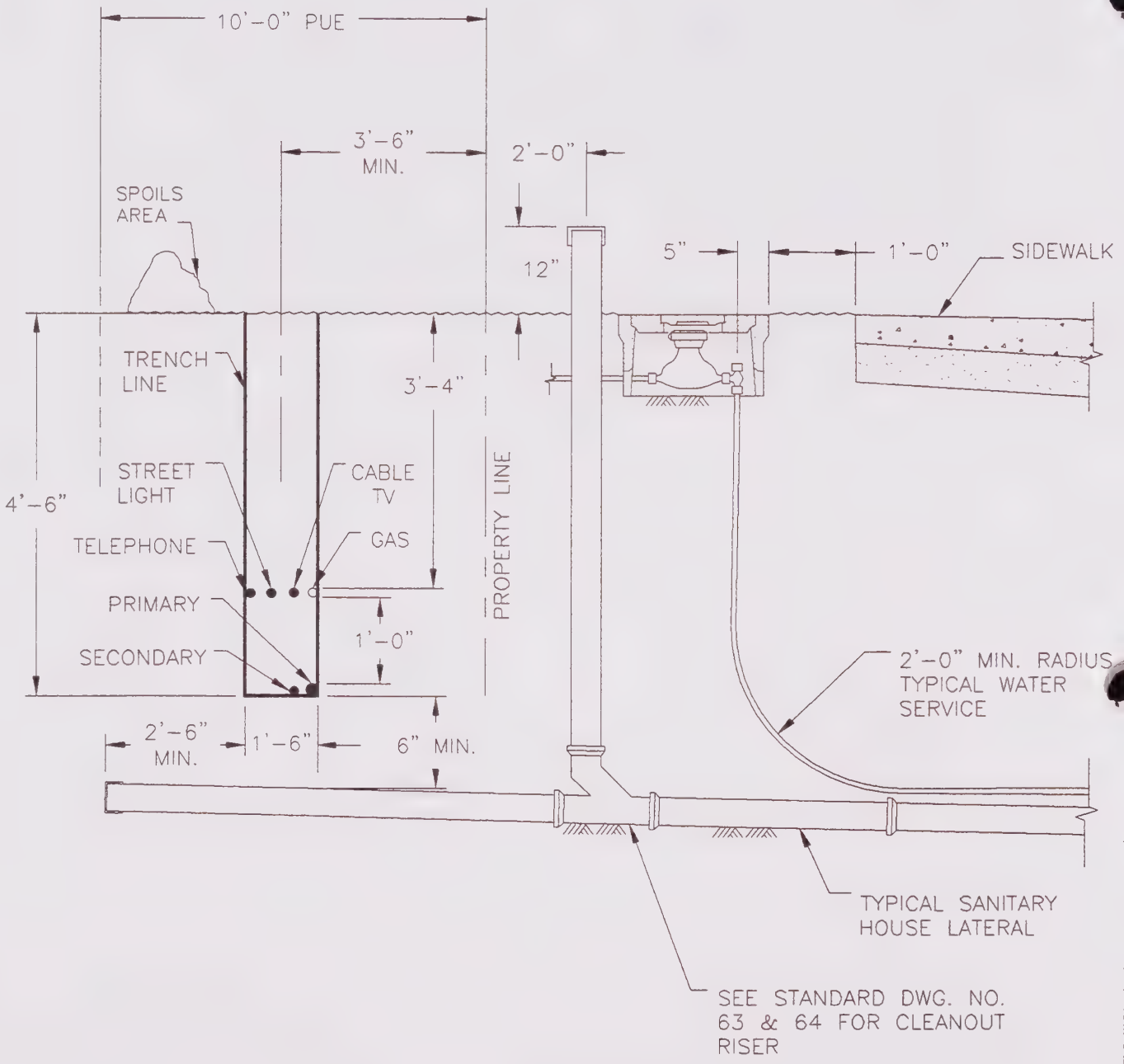
ALTERNATE UNDERGROUND UTILITY LOCATIONS
CASE 2 - C,G, & SW WITH NO PLANTER STRIP

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 11/25/03

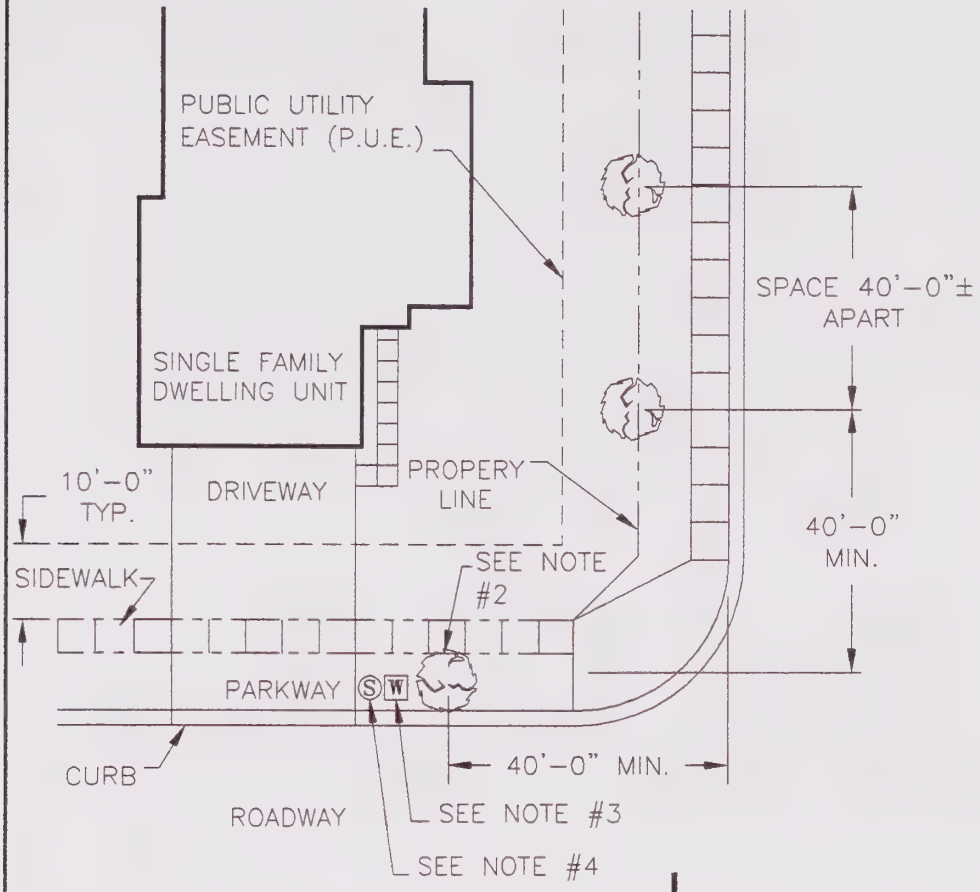
SUPERCEDES DWG. DATED	DRAWING NO.
01/09/02	5D

(CONT'D FROM DWG. 5D)

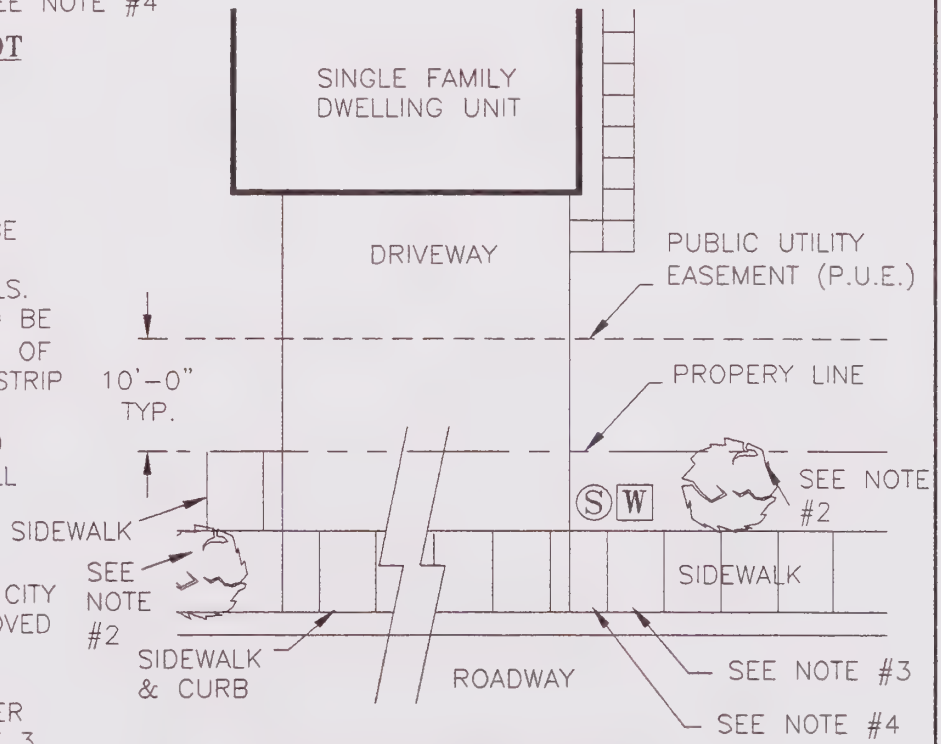


A-A SECTION

REV. NO.	REV. DATE	REV. BY	ALTERNATE UNDERGROUND UTILITY LOCATIONS	REVISION APPROVED BY CITY ENGINEER
4	6/1/2003	HL/EA	CASE 2 - C,G, & SW WITH NO PLANTER STRIP	Finbarr J. O'Regan
DIGITIZED	7/1/91			DATE: 11/25/03
DWG. BY RC	SCALE		CITY OF STOCKTON	SUPERCEDES DWG. DATED
CK. BY	NONE		DEPARTMENT OF PUBLIC WORKS	2/23/95
				DRAWING NO. 5E



TYPICAL CORNER LOT
SEE NOTE #6



TYPICAL INTERIOR LOT
SEE NOTE #6

NOTES:

1. ALL APPROVED TREES TO BE INSTALLED PER CITY OF STOCKTON STANDARD DETAILS.
2. APPROVED STREET TREE TO BE LOCATED 6'–0" FROM BACK OF SIDEWALK IF NO PARKWAY STRIP AND 6'–0" MIN. AWAY FROM ANY UTILITY BOX AND 15'–0" MIN. AWAY FROM ALL STREET LIGHTS & SIGNS.
3. WATER METER
4. SANITARY CLEANOUT
5. TREES TO BE PLANTED BY CITY UNLESS OTHERWISE APPROVED BY PERMIT.
6. UNLESS SITE CONDITIONS REQUIRE OTHERWISE, CORNER LOTS SHALL HAVE AT LEAST 3 STREET TREES AND INTERIOR LOTS SHALL HAVE AT LEAST ONE STREET TREE.

REV. NO.	REV. DATE	REV. BY	TYPICAL TREE PLANTING LOCATIONS	NEW DRAWING APPROVED BY CITY ENGINEER
	6/1/2003	HL/EA		Finbarr J. O'Regan
DIGITIZED				DATE: 11/25/03
DWG. BY HLE	SCALE		CITY OF STOCKTON	SUPERCEDES DWG. DATED 01/09/02
CK. BY	NONE		DEPARTMENT OF PUBLIC WORKS	DRAWING NO. 5F

SUBDIVISION DESIGN STANDARDS

BLOCK:

FACTORS GOVERNING DIMENSIONS:

BLOCK LENGTH AND WIDTH OR ACREAGE WITHIN BOUNDING ROADS SHALL BE SUCH AS TO ACCOMMODATE THE SIZE OF LOT REQUIRED IN THE AREA BY THE ZONING PLAN & TO PROVIDE FOR CONVENIENT ACCESS. CIRCULATION CONTROL AND SAFETY OF STREET TRAFFIC. BLOCK LENGTHS SHALL NOT EXCEED 1300'–0". PEDESTRIAN WALKWAYS MAY BE PERMITTED IN LOCATIONS DEEMED NECESSARY FOR PUBLIC HEALTH, CONVENIENCE, AND NECESSITY.

* LOTS:

* RESIDENTIAL

RESIDENTIAL LOTS SHALL HAVE A MINIMUM WIDTH OF 50'–0" AT THE REQUIRED BUILDING SETBACK LINE. ON CUL–DE–SAC AND CURVILINEAR STREETS THE MINIMUM WIDTH SHALL BE MEASURED ALONG THE ARC LENGTH AT THE BUILDING SETBACK LINE. LOTS SHALL HAVE A MINIMUM AREA CONFORMING TO THE STANDARDS SET FORTH IN THE ZONING PLAN. LOT DIMENSION SHALL BE SHOWN ON THE MAP FOR CURVILINEAR FRONTAGE. LOT FRONTAGES AND AREAS DEVIATING FROM THESE STANDARDS SHALL BE APPROVED BY THE PLANNING COMMISSION.

* CONFIGURATION:

ALL RESIDENTIAL LOTS SHALL ABUT BY THEIR FULL FRONTAGE ON A PUBLICLY DEDICATED STREET EASEMENT, OR PRIVATE ROADWAY AS APPROVED BY THE PLANNING COMMISSION. DOUBLE FRONTAGE LOTS OF LESS THAN 200'–0" IN DEPTH SHALL NOT BE PERMITTED EXCEPT WHERE ACCESS RIGHTS TO ONE FRONTAGE HAVE BEEN DEDICATED TO THE CITY.

* LOT LINES:

SIDE LOT LINES SHALL BE AT RIGHT ANGLES TO STRAIGHT STREET LINES OR RADIAL TO CURVED STREET LINES.

* UNINHABITABLE LOTS:

LOTS OR LAND SUBJECT TO FLOODING OR DEEMED BY THE COMMISSION TO BE UNINHABITABLE SHALL NOT BE PLATTED FOR RESIDENTIAL OCCUPANCY. NOR FOR SUCH OTHER USES AS MAY INCREASE DANGER TO HEALTH, LIFE, OR PROPERTY OR AGGRAVATE THE FLOOD HAZARD UNLESS THE FLOOD HAZARD OR OTHER CONDITION MAKING THE LOTS UNINHABITABLE IS CORRECTED TO THE SATISFACTION OF THE CITY ENGINEER. ANY LAND WITHIN THE SUBDIVISION WHICH IS SUBJECT TO FLOODING OR OTHER UNINHABITABLE CONDITIONS SHALL BE SET ASIDE FOR SUCH USES AS SHALL NOT BE ENDANGERED BY PERIODIC OR OCCASIONAL INUNDATION OR SHALL NOT PRODUCE UNSATISFACTORY LIVING CONDITIONS.

* DEVIATION FROM THESE SECTIONS REQUIRES PLANNING COMMISSION APPROVAL

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SUBDIVISION DESIGN STANDARDS

CITY OF STOCKTON
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Finbar J. O'Regan
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(CONT'D FROM DWG. 6)

SUBDIVISION DESIGN STANDARDS

LOT DRAINAGE:

EACH LOT SHALL BE DESIGNED, GRADED AND MAINTAINED TO PROVIDE PROPER DRAINAGE WITHOUT PONDING OR CAUSING SOIL EROSION. DRAINAGE FROM EACH LOT SHALL BE CONFINED WHOLLY TO THAT LOT UNTIL IT IS DISCHARGED UPON AN ABUTTING STREET. A WAIVER OF THESE PROVISIONS SHALL OCCUR ONLY WHEN OTHER ALTERNATE DRAINAGE FACILITIES AND RECORDED EASEMENTS ARE PROVIDED. THE RESPONSIBILITY FOR MAINTENANCE OF SUCH FACILITIES IS CLEARLY ESTABLISHED, AND SUCH ALTERNATE PLAN IS APPROVED IN WRITING BY THE CITY ENGINEER. TYPICAL LOT DRAINAGE DETAILS SHALL BE SHOWN ON THE GRADING PLAN AS PART OF THE IMPROVEMENT PLANS.

EASEMENTS:

EASEMENTS SHALL BE PROVIDED WHERE NECESSARY AND OF SUCH WIDTH AS REQUIRED BY THE CITY ENGINEER. WHERE A SUBDIVISION IS ADJACENT TO, ABUTS, OR IS TRAVERSED BY A WATER COURSE, DRAINAGE WAY, CHANNEL, OR A STREAM, THERE SHALL BE PROVIDED A STORM WATER EASEMENT OR DRAINAGE RIGHT OF WAY CONFORMING SUBSTANTIALLY WITH THE LINES OF SUCH WATER COURSE, AND OF SUCH CONFIGURATION AS WILL BE ADEQUATE FOR THE PURPOSE OF MAINTAINING DRAINAGE. REASONABLE PUBLIC ACCESS SHALL BE PROVIDED BY EASEMENT FROM PUBLIC STREET TO A PORTION OF THE BANK OF A RIVER OR STREAM BORDERING OR LYING WITHIN THE PROPOSED SUBDIVISION.

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GENERAL:

PURPOSE AND INTENT

THE PURPOSE AND INTENT OF THESE DESIGN STANDARDS IS TO CLARIFY AND CONSOLIDATE PRESENT DESIGN CRITERIA IN THE CITY OF STOCKTON.

SCOPE

THE DESIGN STANDARDS AS HEREINAFTER SPECIFIED SHALL BE USED AS THE BASIS OF DESIGN FOR ALL DEVELOPMENT WITHIN THE JURISDICTION OF THE CITY OF STOCKTON.

DESIGN

THE DESIGN OF EACH DEVELOPMENT IS IN ITSELF A SPECIAL CASE AND THESE DESIGN STANDARDS SHALL BE CONSTRUED TO BE THE MINIMUM REQUIRED DESIGN ON ALL OR ANY SEPARATE PHASE OF THE CONSTRUCTION. UNDER CERTAIN CONDITIONS, ANY OR ALL PHASES MAY BE REQUIRED TO EXCEED THESE SPECIFICATIONS. IT IS ALSO RECOGNIZED THAT THERE MAY BE DEVELOPMENTS WHERE IT IS IMPOSSIBLE TO MEET THESE DESIGN STANDARDS. IT IS SUGGESTED THAT THESE CASES BE REVIEWED WITH THE CITY ENGINEER EARLY IN THE DESIGN PROCESS TO MINIMIZE REWORKING PLANS WHERE DEVIATION IS NOT PERMITTED.

FINAL AUTHORITY

THE CITY ENGINEER SHALL BE THE FINAL AUTHORITY ON ALL QUESTIONS WHICH MAY ARISE AS TO THE INTERPRETATION OF THESE STANDARDS. THE CITY ENGINEER'S DECISION SHALL BE FINAL AND HE SHALL HAVE AUTHORITY TO ENFORCE AND MAKE EFFECTIVE SUCH DECISIONS, EXCEPT AS NOTED.

HORIZONTAL ALIGNMENT:

CONFORMITY

THE ARRANGEMENT, CHARACTER, EXTENT, WIDTH, GRADE AND LOCATION OF ALL STREETS SHALL CONFORM TO THE OFFICIAL MAP OR GENERAL PLAN AND SHALL BE CONSIDERED IN THEIR RELATION TO EXISTING AND PLANNED STREETS, TO TOPOGRAPHICAL CONDITIONS, TO PUBLIC CONVENIENCE AND SAFETY AND IN THEIR APPROPRIATE RELATION TO THE PROPOSED USES OF THE LAND TO BE SERVED BY SUCH STREETS. WHERE NOT SHOWN ON THE OFFICIAL MAP OR GENERAL PLAN, THE ARRANGEMENT AND OTHER DESIGN STANDARDS OF STREETS SHALL CONFORM TO THE PROVISIONS FOUND HEREIN.

RELATION TO ADJOINING STREET SYSTEM

THE ARRANGEMENT OF STREETS IN NEW SUBDIVISIONS SHALL MAKE PROVISION FOR THE CONTINUATION OF THE EXISTING STREETS IN ADJOINING AREAS.

PROJECTION OF STREETS

WHERE ADJOINING AREAS ARE NOT SUBDIVIDED, THE ARRANGEMENT OF STREETS IN NEW SUBDIVISIONS SHALL MAKE PROVISION FOR THE PROPER PROJECTION OF STREETS TO THE SUBDIVISION BOUNDARY LINE, OR LOT LINE, AS SPECIFIED. ADEQUATE TEMPORARY TURN-A-ROUNDS, INCLUDING EASEMENTS IF NECESSARY, SHALL BE PROVIDED AS APPROVED BY THE CITY ENGINEER.

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STREET DESIGN STANDARDS

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(CONT'D FROM DWG. 7)

JOGS PROHIBITED

STREET JOGS WITH CENTERLINE OFFSETS OF LESS THAN 200'–0" SHALL BE PROHIBITED, UNLESS APPROVED BY THE CITY ENGINEER.

DEAD–END STREETS OR CUL–DE–SACS

DEAD–END STREETS OR CUL–DE–SAC DESTINED TO BE SO PERMANENTLY SHALL NOT BE LONGER THAN 500'–0" AND SHALL BE PROVIDED AT THE CLOSED END WITH A TURN–AROUND HAVING A STREET PROPERTY LINE DIAMETER IN CONFORMITY WITH THE STANDARD SPECIFICATIONS.

MINOR STREETS

MINOR STREETS SHALL BE SO LAID OUT THAT THEIR USE BY THROUGH TRAFFIC WILL BE DISCOURAGED.

STREET WIDTHS

STREET RIGHT–OF–WAY WIDTHS SHALL BE ESTABLISHED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

INTERSECTIONS

THE INTERSECTION OF MORE THAN TWO STREETS AT ONE POINT SHALL BE AVOIDED EXCEPT WHERE IT IS IMPRACTICABLE TO SECURE A REASONABLE STREET SYSTEM OTHERWISE. STREETS SHALL INTERSECT AT AN ANGLE AS NEAR TO A RIGHT ANGLE AS POSSIBLE, AND NO INTERSECTIONS OF STREETS AT ANGLES LESS THAN 75 DEGREES SHALL BE APPROVED. STREET INTERSECTIONS SHALL BE ROUNDED WITH A RADIUS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. STREET INTERSECTION RIGHT OF WAY SHALL BE ANGLED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

CURVATURE

THE MINIMUM CENTERLINE RADIUS OF CURVATURE SHALL BE 750'–0" ON ARTERIALS AND 500'–0" ON COLLECTORS. MINIMUM CENTER LINE RADIUS ON OTHER STREETS SHALL BE 250'–0".

REVERSE CURVES

A TANGENT AT LEAST 100'–0" LONG SHALL BE INTRODUCED BETWEEN REVERSE CURVES ON STREETS IF THE RADII OF SUCH CURVES ARE LESS THAN 1000'–0".

REVERSE STRIPS

REVERSE STRIPS SHALL CONTROLLING ACCESS TO STREETS SHALL BE PROHIBITED EXCEPT UNDER CONDITIONS APPROVED BY THE PLANNING COMMISSION.

STREET GRADES

ALL STREET GRADES SHALL CONFORM TO THE REQUIREMENTS OF THE CITY ENGINEER. ALL ELEVATIONS SHALL BE BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929, C.O.S. LOCAL ADJUSTMENT.

HALF–STREET PROHIBITED

HALF–STREETS SHALL PROHIBITED

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STREET DESIGN STANDARDS

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STREET NAMES AND NUMBERS

NAMES OF NEW STREETS SHALL NOT DUPLICATE EXISTING OR PLATTED STREET NAMES UNLESS A NEW STREET IS A CONTINUATION OF, OR IN ALIGNMENT WITH THE EXISTING OR PLATTED STREET. HOUSE NUMBERS SHALL BE ASSIGNED IN ACCORDANCE WITH THE HOUSE NUMBERING SYSTEM IN EFFECT IN THE CITY.

ACCESS TO STREETS ACROSS DITCHES OR DRAINAGE CANALS

1. EXCEPT AS PROVIDED FOR IN CHAPTER 16 OF THE STOCKTON MUNICIPAL CODE, THE SUBDIVIDER SHALL PROVIDE RIGHT-OF-WAY AND MAKE PROVISIONS FOR IMPROVEMENTS FOR ALL STREETS AND STRUCTURES THAT CROSS DITCHES OR DRAINAGE CANALS LYING WITHIN HIS SUBDIVISION OR PORTION THEREOF.
2. SAID DITCHES AND CANALS SHALL BE CROSSED IN A MANNER APPROVED BY THE CITY ENGINEER.

* PRIVATE STREETS

PRIVATE STREETS SHALL NOT BE PLATTED OR MAPPED IN A SUBDIVISION EXCEPT WITHIN A P.U.R.D. OR CONDOMINIUM PROJECT OR AS APPROVED BY THE PLANNING COMMISSION.

AVOIDANCE OF HARDSHIP TO ADJOINING PROPERTY OWNERS

THE STREET ARRANGEMENTS SHALL NOT BE SUCH AS TO CAUSE HARDSHIP TO OWNERS OF ADJOINING PROPERTY IN PLATTING THEIR OWN LAND AND PROVIDING CONVENIENT ACCESS TO IT.

ALLEYS

ALLEYS SHALL NOT BE PERMITTED IN RESIDENTIAL AREAS. ALLEYS SHALL BE PROVIDED IN COMMERCIAL AND INDUSTRIAL DISTRICTS, EXCEPT THAT THE CITY PLANNING COMMISSION MAY WAIVE THIS REQUIREMENT WHERE OTHER DEFINITE AND ASSURED PROVISIONS ARE MADE FOR THE SERVICE ACCESS, SUCH AS OFF-STREET LOADING, UNLOADING, AND PARKING CONSISTENT WITH, AND ADEQUATE FOR, THE USES PROPOSED. THE MINIMUM RIGHT-OF-WAY WIDTH OF AN ALLEY SHALL BE 20'-0". DEAD-END ALLEYS SHALL NOT BE PERMITTED.

VERTICAL ALIGNMENT

TOP OF CURB GRADES

GRADES SHALL NOT BE LESS THAN 0.35 PERCENT AND NOT GREATER THAN 6 PERCENT. WHERE MATCHING EXISTING CONTROLS, THE MINIMUM GRADE MAY BE REDUCED WITH THE APPROVAL OF THE CITY ENGINEER. THE MINIMUM TOP OF CURB ELEVATION SHALL BE 1'-0" ABOVE THE DESIGN WATER SURFACE OF THE MASTER PLAN STORM DRAINAGE BASIN TO WHICH THE PROPOSED IMPROVEMENTS ARE TRIBUTARY. THIS MINIMUM ELEVATION MAY BE OBTAINED FROM THE CITY ENGINEER FOR EXISTING BASINS. A MINIMUM TOP OF CURB ELEVATION OF 1'-0" ABOVE THE HYDRAULIC GRADE LINE SHALL BE MAINTAINED. GRADES ON OPPOSITE SIDES OF THE STREET SHALL BE THE SAME WHEREVER PRACTICAL. THE ALGEBRAIC DIFFERENCE OF THE CENTERLINE GRADES OF THE PAVEMENT SURFACE THROUGH AN INTERSECTION SHALL NOT BE MORE THAN 2 PERCENT. FLOW LINES SHALL BE SHOWN ON ALL INTERSECTIONS. SPOT ELEVATIONS SHALL BE SHOWN WITHIN INTERSECTIONS AS NEEDED.

* DEVIATION FROM THESE SECTIONS REQUIRES PLANNING COMMISSION APPROVAL

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STREET DESIGN STANDARDS

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STRUCTURAL SECTION

PRIVATE STREET STRUCTURAL SECTIONS SHALL BE CONSTRUCTED TO PUBLIC STREET STANDARDS AND SHALL BE BASED ON A MINIMUM TI=5 AND R=5. PRIVATE STREETS SHALL BE PROVIDED WITH CITY STANDARD CONCRETE CURBS AND GUTTERS AND A MINIMUM WIDTH OF 30'-0" FROM CURB TO CURB.

VERTICAL CURVES

WHERE THE ALGEBRAIC DIFFERENCE IN SLOPE EXCEEDS 1 PERCENT, A VERTICAL CURVE SHALL BE USED. VERTICAL CURVE DESIGNS SHALL BE BASED ON CALTRANS STANDARDS.

CROSS-SLOPES

ON EXISTING STREETS, CROSS-SLOPES OF WIDENED AREAS SHALL BE 3 PERCENT MAXIMUM UNLESS OTHERWISE APPROVED BY THE CITY ENGINEER.

TRAFFIC SIGNS AND MARKINGS

A TRAFFIC SIGNS AND MARKINGS PLAN AND INSTALLATION SHALL BE PROVIDED FOR ALL NEW ARTERIAL AND COLLECTOR STREETS AS DETERMINED BY THE CITY TRAFFIC ENGINEER. STRIPING FOR NEW STREETS JOINING AN EXISTING COLLECTOR OR ARTERIAL SHALL INCLUDE TRANSITION TO MATCH THE NEW AND EXISTING STRIPING. STRIPING MAY EXTEND BEYOND THE PROJECT LIMITS TO PROVIDE PROPER LANE TRANSITION AS REQUIRED BY THE CITY TRAFFIC ENGINEER. THE TRAFFIC CONTROL DEVICES AND PAVEMENT MARKERS TO BE SHOWN ON THIS PLAN SHALL BE INSTALLED PER APPROPRIATE SECTIONS OF THE LATEST EDITION OF THE CALTRANS TRAFFIC MANUAL.

STREET MICROSURFACING

THE PAVEMENT SECTION FOR ALL NEW STREETS SHALL INCLUDE A MICROSURFACING LAYER AS PER SECTION 101 OF THE STANDARD SPECIFICATIONS. THIS LAYER SHALL BE INSTALLED WHEN EITHER: 1) 80% OF THE PROPERTIES FRONTING THE NEW STREET HAVE BEEN DEVELOPED AND OCCUPIED, OR 2) THE TOP LAYER OF ASPHALT CONCRETE ON THE NEW STREET HAS BEEN IN PLACE FOR TWO YEARS.

SIDEWALKS

ALL NEW SIDEWALKS SHALL BE A MINIMUM OF 6" THICK PORTLAND CEMENT CONCRETE.

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IMPROVEMENT PLAN STANDARDS

ALL IMPROVEMENT PLANS SHALL CONFORM TO THE FOLLOWING REQUIREMENTS AND INCLUDE THE FOLLOWING DETAILED INFORMATION:

1. ALL STREETS AND CUL-DE-SAC SHALL SHOWN CENTER LINE STATIONING. STATIONING SHALL BE TIED OR REFERENCE TO EXISTING MONUMENTS OR OTHER PERMANENT REFERENCE POINTS. EQUATIONS SHALL BE SHOWN AT ALL CENTER LINE INTERSECTIONS.
2. CENTER LINE MONUMENTS IN ACCORDANCE WITH STANDARD DRAWING NO. 122 SHALL BE SET AT THE BEGINNING AND END OF EACH CURVE, AT ALL INTERSECTIONS, AND AT THE ENDS OF ALL CUL-DE-SACS. STATE PLANE COORDINATES BASED ON CALIFORNIA COORDINATE SYSTEM OF 1983, ZONE 3, SHALL BE SHOWN FOR ALL NEW AND EXISTING CENTERLINE MONUMENTS.
3. STREET PLAN SHALL SHOW LOCATION OF UNDERGROUND SANITARY SEWER, STORM DRAIN, IRRIGATION SYSTEM, AND WATER LINES. LOCATION OF LINES SHALL BE REFERENCED TO STREET CENTER LINE. MAINTENANCE HOLES, CATCH BASINS, TEES, VALVES, AND ANY OTHER FITTINGS TOGETHER WITH ANY ANGLE POINTS IN THE LINES SHALL BE REFERENCED TO THE APPROPRIATE CENTER LINE STATION.
4. STREET PLAN SHALL SHOW SIZE AND LENGTH OF PIPES BETWEEN MAINTENANCE HOLES, CATCH BASINS, AND/OR VALVES. WHERE A SPECIFIC TYPE OF PIPE IS TO BE INSTALLED, SUCH TYPE SHALL ALSO BE INDICATED.
5. STREET PLAN SHALL ALSO SHOW TYPE OF CURB, GUTTER AND SIDEWALK TO BE INSTALLED AND TOP OF CURB ELEVATIONS AT THE BEGINNING AND END OF EACH CURB RETURN. EACH CATCH BASIN AND ANY GRADE BREAKS SHALL BE INDICATED. GRADE BREAKS SHALL BE STATIONED.
6. EXISTING UTILITY INSTALLATIONS SHALL BE SHOWN AS DETAILED ABOVE.
7. STREET PROFILE SHEETS SHALL SHOW THE SIZE, LENGTH, SLOPE, TYPE, STATION AND ELEVATION OF ALL EXISTING AND PROPOSED SANITARY SEWER, STORM DRAIN, IRRIGATION AND WATER PIPE LINES. INVERT ELEVATIONS AT THE ENDS OF EACH PIPE AND AT MAINTENANCE HOLES AND CATCH BASINS SHALL BE INDICATED. MAINTENANCE HOLE'S RIM ELEVATIONS SHALL BE SHOWN. THE STATION AND ELEVATION OF HORIZONTAL AND VERTICAL BENDS SHALL BE SHOWN. CATCH BASIN RUNS SHALL BE SHOWN ON ALL SHEETS.
8. STREET PROFILE SHALL SHOW THE EXISTING GROUND PROFILE AND THE DATE AT WHICH THE PROFILE WAS TAKEN. PROFILES OF THE EXISTING AND PROPOSED CURB AND GUTTERS SHALL BE SHOWN. PROFILES SHALL SHOW THE SLOPE TOGETHER WITH THE ELEVATION AND STATIONING AT EACH BREAK AND AT THE BEGINNING AND END OF EACH CURB RETURN.
9. IMPROVEMENT PLAN STANDARDS FOR STREET LIGHTING WORK SHALL CONFORM TO STANDARD PLANS NO. 109 THROUGH 115A.
10. ALL ELEVATIONS SHALL BE BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929 AND C.O.S. LOCAL ADJUSTMENT. THE PRIMARY BENCH MARK SHALL BE SHOWN AND DESCRIBED ON THE TITLE SHEET.
11. A MINIMUM OF ONE TEMPORARY BENCH MARK SHALL BE INDICATED ON EACH SHEET OF THE PLANS. EACH TEMPORARY BENCH MARK SHALL HAVE BEEN CONVENIENTLY LOCATED FOR USE IN CONSTRUCTING THE IMPROVEMENTS ON THAT PARTICULAR SHEET.
12. AT THE CONCLUSION OF CONSTRUCTION, AS-BUILT CONSTRUCTION DATA ON FACILITIES WHICH ARE TO BE EXTENDED IN THE FUTURE SHALL BE ADDED TO THE IMPROVEMENT PLANS.
13. HORIZONTAL AND VERTICAL SCALES SHALL BE SHOWN ON EACH OF THE IMPROVEMENT PLANS.

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14. SLOPES IN THE INTERSECTIONS SHALL BE SHOWN IN BOTH PLAN AND PROFILE VIEW WITH SUFFICIENT DETAIL FOR THE CITY ENGINEER TO DETERMINE THE DRAINAGE CHARACTERISTICS OF THE INTERSECTION. EXISTING CONDITIONS SHALL BE SHOWN A MINIMUM OF 100'–0" OR AS DETERMINED BY THE CITY ENGINEER, BEYOND THE LIMITS OF CONSTRUCTION IN BOTH THE PLAN AND PROFILE VIEW. PAVEMENT PROFILES SHALL BE SHOWN IN THE PROFILE VIEW FOR INTERSECTIONS AND IN CUL–DE–SAC BULBS. EACH END OF CURB RETURN SHALL BE SHOWN WITH STATIONS AND ELEVATIONS IN THE PROFILE VIEW. WHERE THE CITY ENGINEER DEEMS IT APPROPRIATE, INTERSECTIONS SHALL BE DETAILED SEPARATELY.

15. PLAN FEATURES INCLUDING THE CENTERLINE, EDGE OF PAVEMENT, PROPOSED TOP OF CURB ELEVATIONS, AND EXISTING/PROPOSED CROSS SLOPES, SHALL BE SHOWN IN THE PLAN VIEW AT 50'–0" INTERVALS WHERE PROPOSED PROJECTS ABUT EXISTING STREETS.

16. ALL UNDERGROUND STRUCTURES SHALL BE STATIONED IN THE PROFILE VIEW. WHEN A NON–STANDARD STRUCTURE OR SITUATION IS PLANNED. DETAILS SHALL BE INCLUDED ON THE IMPROVEMENT PLANS AND SUPPORTING CALCULATIONS AND DRAWINGS SHALL BE SUBMITTED FOR REVIEW AND APPROVAL BY THE CITY ENGINEER.

17. LANDSCAPE PLANS SHALL BE INCORPORATED INTO IMPROVEMENT PLANS AND SUBMITTED ALONG WITH SUCH PLANS.

18. ALL STREET AND UTILITY PLANS SHALL SHOW EXISTING CITY STREET TREES AND ALL OAK TREES WITH A DIAMETER OF 6" OR GREATER AS MEASURED AT 2'–0" ABOVE EXISTING GRADE.

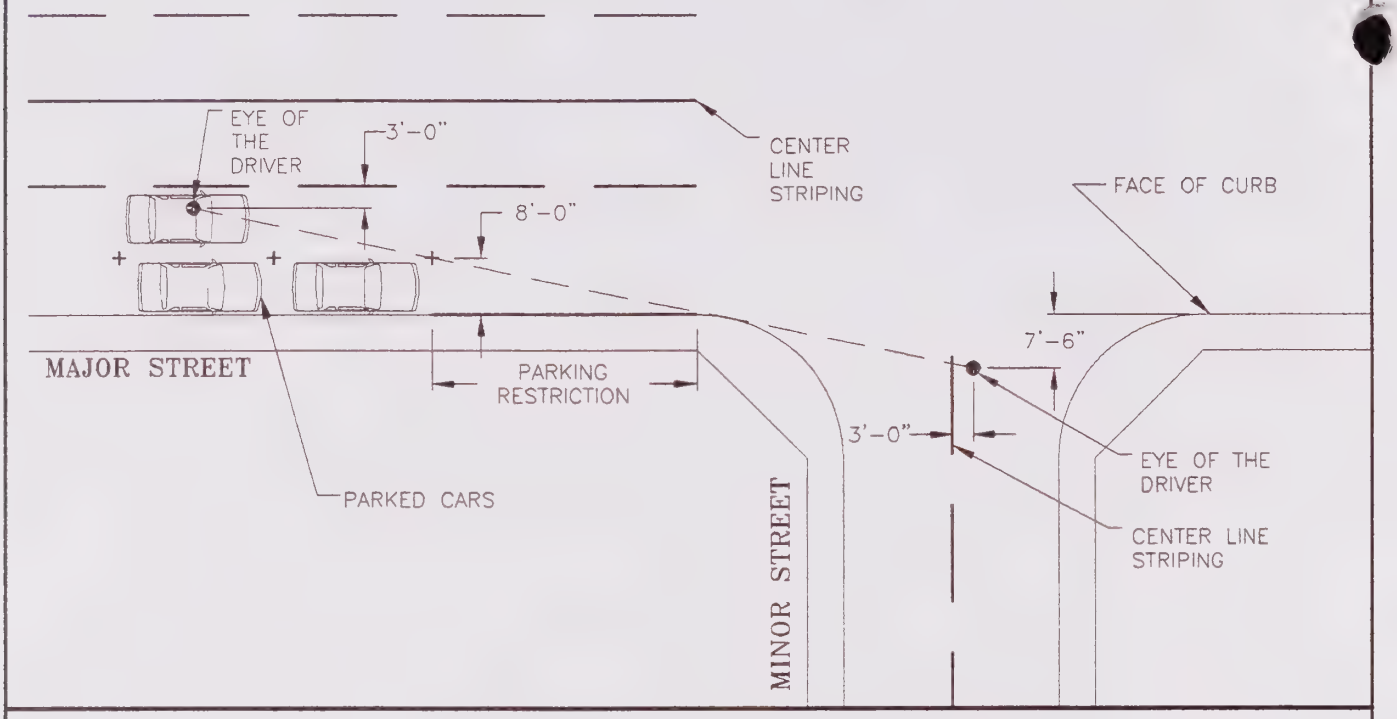
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IMPROVEMENT PLAN STANDARDS

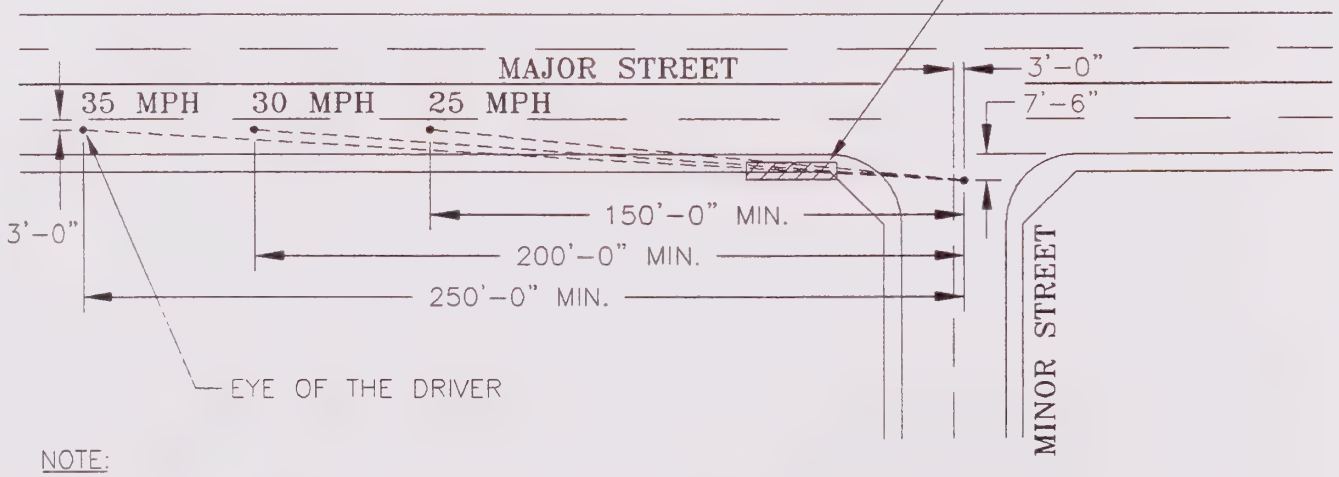
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NO FIXED OBSTRUCTION GREATER THAN 3'-0" HIGH SHALL BE PLACED IN CONFLICT WITH THE LINE OF SIGHT AS DETERMINED BY THE CITY TRAFFIC ENGINEER



NOTE:

1. FOR OTHER SPEEDS, REFER TO TABLE 1 ON DRAWING NO. 9A.
2. REFER TO STOCKTON MUNICIPAL CODES FOR LANDSCAPING STANDARDS.

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CORNER SIGHT DISTANCE

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NEW DRAWING APPROVED BY CITY ENGINEER
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(CONT'D FROM DWG. 9)

MINIMUM CORNER SIGHT DISTANCE FOR STOCKTON, CALIFORNIA

REFER TO CORNER SIGHT DISTANCE ON STANDARD DRAWING FOR SOUNDWALLS (EXISTING DRAWING 125). THE MINIMUM VALUE SHALL BE THE STOPPING SIGHT DISTANCE GIVEN IN THE FOLLOWING TABLE. THIS TABLE IS FOR FLAT TERRAIN.

TABLE 1:

DESIGN SPEED (MPH)	SIGHT STOPPING DISTANCE* (FEET)
20	125
25	150
30	200
35	250
40	300
45	360
50	430

THE STOPPING SIGHT DISTANCE GIVEN IN THE ABOVE TABLE IS MEASURED FROM A 3'–6" EYE HEIGHT ON THE MINOR ROAD TO A 4'–3" OBJECT HEIGHT ON THE MAJOR STREET. LOCATION OF THE DRIVER'S EYE IS 7'–6" BACK FROM THE FACE OF CURB (FRONT OF VEHICLE TO DRIVER) AND 3'–0" TO THE RIGHT OF THE NUMBER ONE LANE LINE. SEE DIAGRAM.

* A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS, AASHTO 1990 TABLE III–1 PAGE 120.

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CORNER SIGHT DISTANCE

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TRIP GENERATION FACTORS

THE FOLLOWING TRIP END FACTORS SHALL BE USED IN DETERMINING THE AVERAGE DAILY TRAFFIC INVOLVED IN STREET DESIGN.

TRIP END: THE ORIGIN OR DESTINATION OF A TRIP. EACH TRIP HAS TWO ENDS. G.S.F.: GROSS SQUARE FEET OF FLOOR AREA.

	AVERAGE WEEKDAY VEHICLE TRIP ENDS (TE)
SINGLE FAMILY	10 TE/DWELLING UNIT
APARTMENTS	6.1 TE/DWELLING UNIT
CONDOMINIUM/PURD	8.6 TE/DWELLING UNIT
MOBILE HOME	5.4 TE/DWELLING UNIT
RETIREMENT COMMUNITY	3.3 TE/DWELLING UNIT
HOTELS	11.0 TE/ROOM
MOTELS	9.6 TE/ROOM
CITY PARK	60 TE/ACRE OR 7.8 TE/PARKING SPACE
GENERAL OFFICE	17.7 TE/1000 G.S.F.
MEDICAL OFFICE	75 TE/1000 G.S.F.
FAST FOOD/DRIVE THRU	680 TE/1000 G.S.F.
FREE STANDING RETAIL	73.7 TE/1000 G.S.F.
SERVICE STATION	133 TE/PUMP OR 748 TE
SUPERMARKET	126 TE/1000 G.S.F.
CONVENIENCE MARKET w/GAS PUMPS	730 TE/1000 G.S.F.
CONVENIENCE MARKET	473 TE/1000 G.S.F.
INDUSTRIAL/INDUSTRIAL PARK	7.6 TE/1000 G.S.F.
INDUSTRIAL SERVICE	20.26 TE/1000 G.S.F.
DAY CARE/PRESCHOOL	79.0 TE/1000 G.S.F.
OFFICE PARK	20.7 TE/1000 G.S.F.
SHOPPING CENTER	SEE (ITE) TRIP GENERATION REPORT

FOR LAND USES AND/OR DEVELOPMENTS NOT SHOWN ABOVE, CONTACT THE CITY TRAFFIC ENGINEER.

SOURCE: "TRIP GENERATION" AN INFORMATIONAL REPORT, INSTITUTE OF TRANSPORTATION ENGINEERS (6TH EDITION) PERIODIC UPDATE, AND OTHER TRIP GENERATION PUBLICATIONS.

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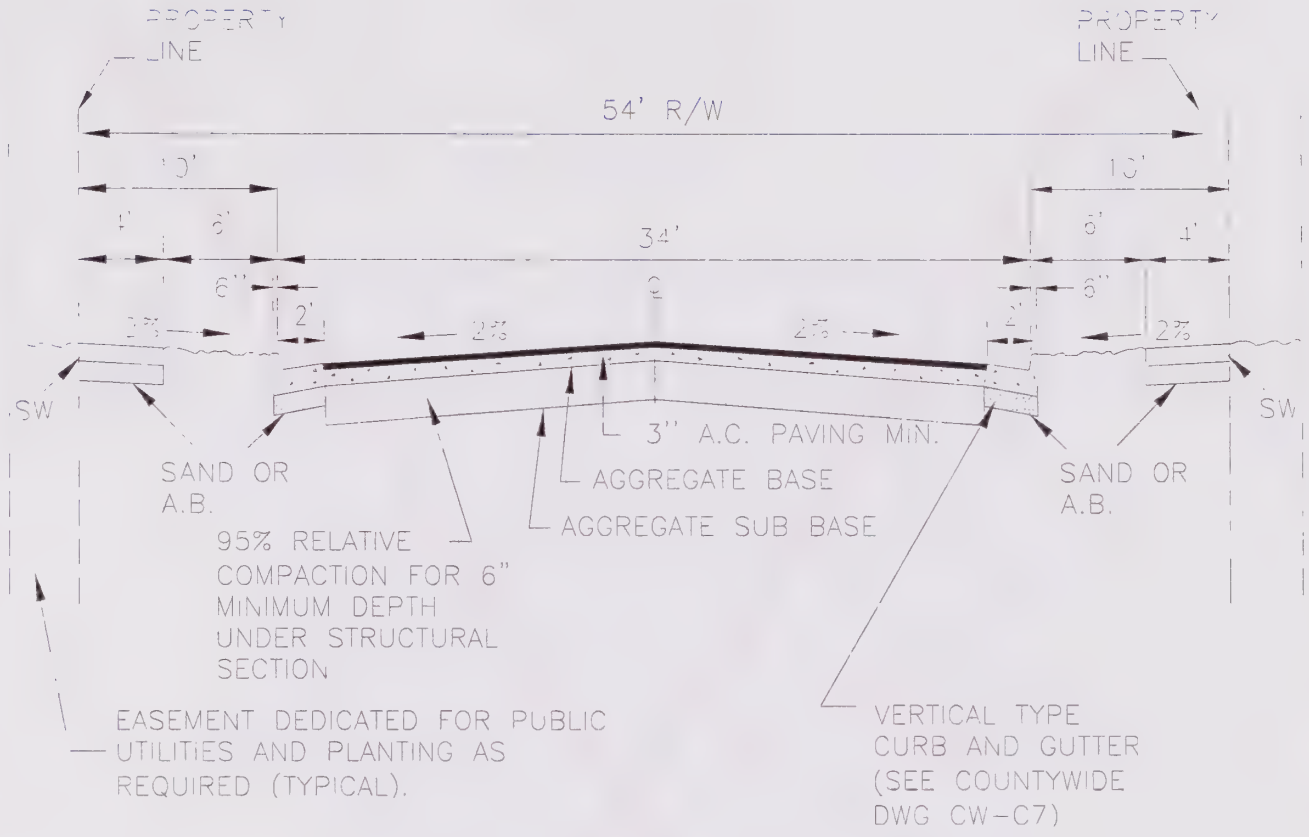
TRIP GENERATION FACTORS

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DWG. BY	RC	SCALE
CK. BY		NONE

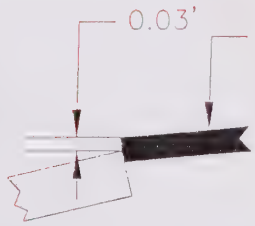
CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

SUPERCEDES DWG. DATED	DRAWING NO.
11/8/80	10



NOTES:

1. AT A MINIMUM STREET STRUCTURAL SECTION SHALL BE DESIGNED TO CALTRANS STANDARDS.
2. STRUCTURAL SECTION DESIGN SHALL BE APPROVED BY THE CITY ENGINEER BASED UPON ENGINEERING ANALYSIS. THE ENGINEER SHALL SUBMIT CALCULATIONS.
3. LONGITUDINAL GUTTER SLOPE SHALL BE A MINIMUM OF 0.35%.
4. TILL THROUGH PARKWAY AREA PRIOR TO PLANTING.
5. INSTALL TWO 4" DIAMETER SCHEDULE 40 SLEEVES PER LOT (3 FOR CORNER LOT) WITH CAPS UNDER SIDEWALK ACROSS LOT FRONTAGE FOR FUTURE IRRIGATION.
6. REFER TO STANDARD DRAWING NO. 14A FOR MINIMUM DESIGN TRAFFIC INDEX AND APPLICABLE AVERAGE DAILY TRAFFIC RANGE.
7. FIRE CODE REQUIRES AN UNOBSTRUCTED WIDTH OF 20 FT FOR FIRE ACCESS ON ALL PUBLIC AND PRIVATE STREETS. CURB TO CURB WIDTH SHOWN PROVIDES FOR THE FIRE CODE MINIMUM WIDTH AND TWO (2) SEVEN FOOT PARKING LANES. R/W AND ROADWAY WIDTH MAY BE REDUCED WITH THE ELIMINATION OF PARKING LANES, UPON APPROVAL OF THE CITY ENGINEER.



PAVING DETAIL AT LIP OF GUTTER

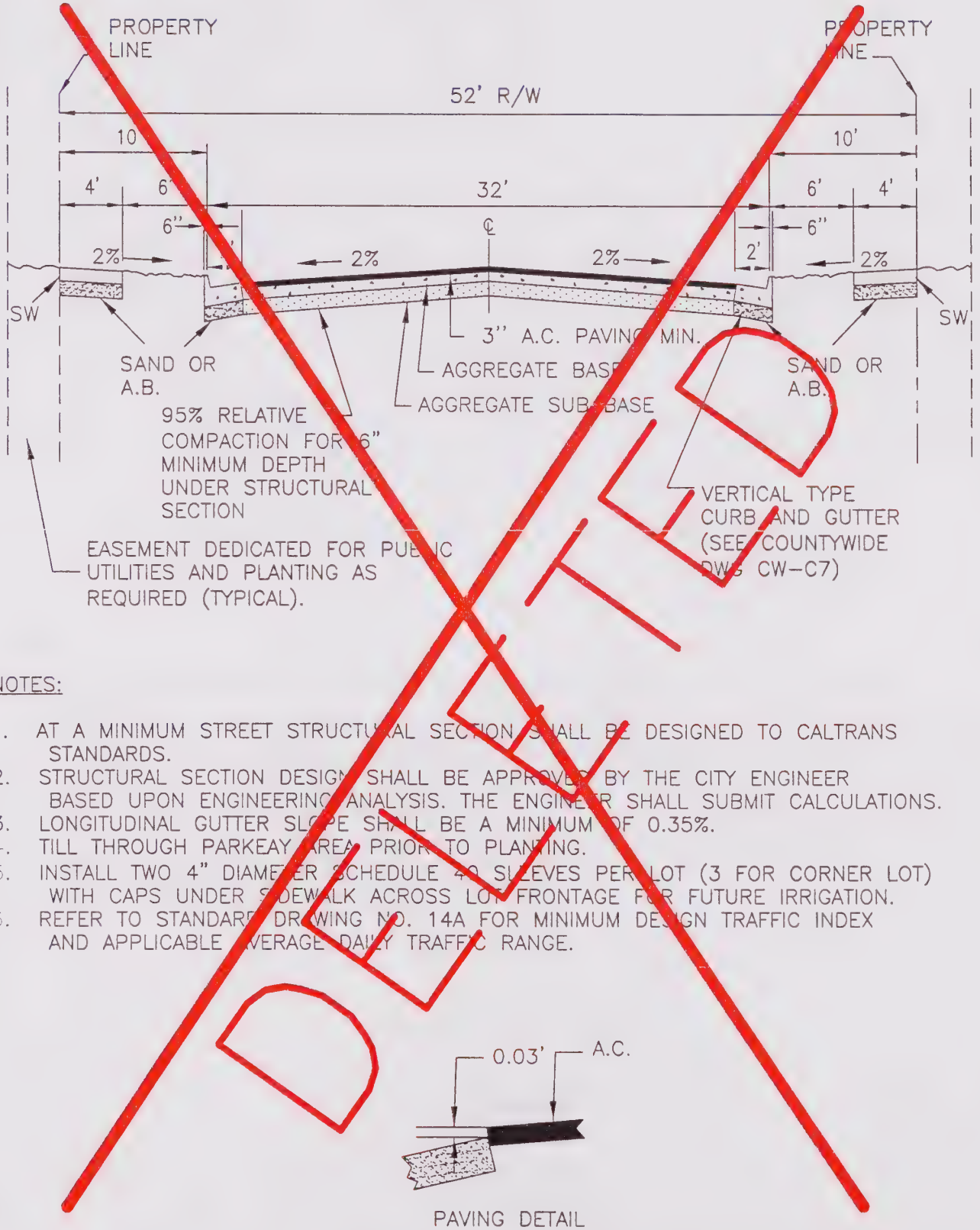
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1		RM/SH
DIGITIZED	6/1/2003	
DWG. BY	SCALE	
CK. BY	NONE	

LOCAL STREET RESIDENTIAL

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Robert F. McDonald
DATE: 3/21/08

SUPERCEDES DWG. DATED	DRAWING NO.
11/23/07	11A



DELETED

NOTES:

1. AT A MINIMUM STREET STRUCTURAL SECTION SHALL BE DESIGNED TO CALTRANS STANDARDS.
2. STRUCTURAL SECTION DESIGN SHALL BE APPROVED BY THE CITY ENGINEER BASED UPON ENGINEERING ANALYSIS. THE ENGINEER SHALL SUBMIT CALCULATIONS.
3. LONGITUDINAL GUTTER SLOPE SHALL BE A MINIMUM OF 0.35%.
4. TILL THROUGH PARKEAY AREA PRIOR TO PLANTING.
5. INSTALL TWO 4" DIAMETER SCHEDULE 40 SLEEVES PER LOT (3 FOR CORNER LOT) WITH CAPS UNDER SIDEWALK ACROSS LOT FRONTAGE FOR FUTURE IRRIGATION.
6. REFER TO STANDARD DRAWING NO. 14A FOR MINIMUM DESIGN TRAFFIC INDEX AND APPLICABLE AVERAGE DAILY TRAFFIC RANGE.

PAVING DETAIL
AT LIP OF GUTTER

REV. NO.	REV. DATE	REV. BY

DIGITIZED 6/1/2003

DWG. BY

CK. BY

SCALE NONE

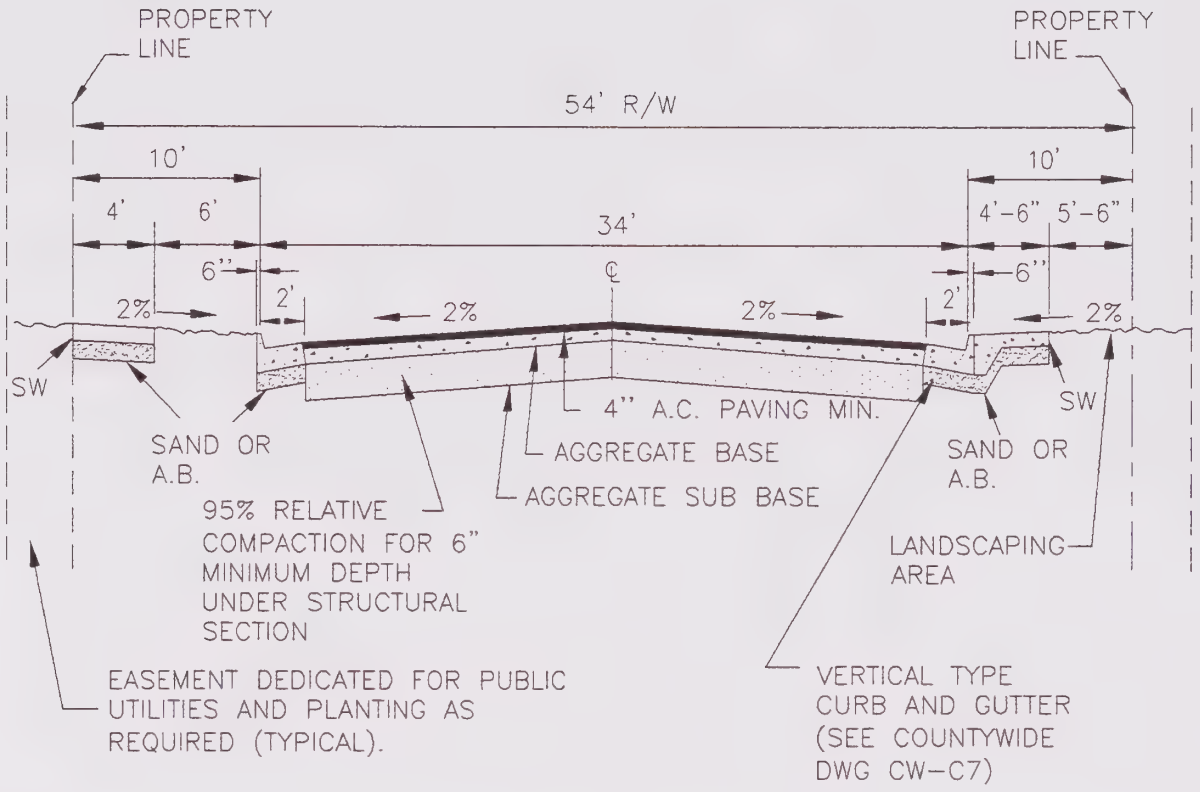
~~LOCAL STREET~~
~~MEDIUM VOLUME RESIDENTIAL~~

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 11/25/03

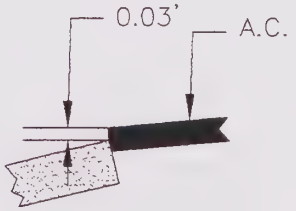
SUPERCEDES DWG. DATED

DRAWING NO. ~~11B~~



NOTES:

1. AT A MINIMUM STREET STRUCTURAL SECTION SHALL BE DESIGNED TO CALTRANS STANDARDS.
2. STRUCTURAL SECTION DESIGN SHALL BE APPROVED BY THE CITY ENGINEER BASED UPON ENGINEERING ANALYSIS. THE ENGINEER SHALL SUBMIT CALCULATIONS.
3. LONGITUDINAL GUTTER SLOPE SHALL BE A MINIMUM OF 0.35%.
4. TILL THROUGH PARKWAY AREA PRIOR TO PLANTING.
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6. REFER TO STANDARD DRAWING NO. 14A FOR MINIMUM DESIGN TRAFFIC INDEX AND APPLICABLE AVERAGE DAILY TRAFFIC RANGE.



PAVING DETAIL
AT LIP OF GUTTER

REV. NO.	REV. DATE	REV. BY
DIGITIZED	6/1/2003	
DWG. BY	SCALE	
CK. BY	NONE	

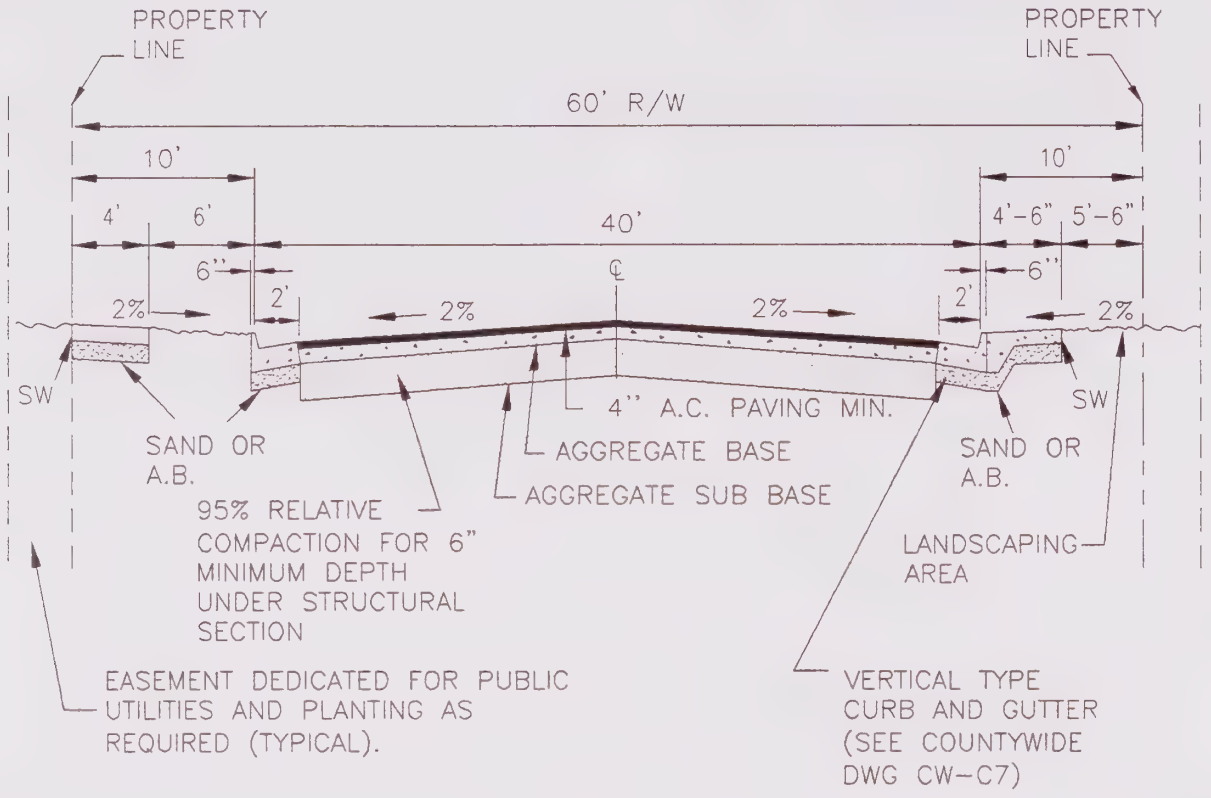
LOCAL STREET
COMMERCIAL

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbarr J. O'Regan
DATE: 11/25/03

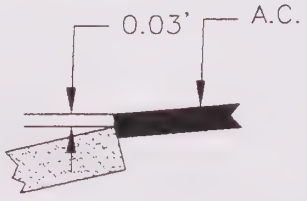
SUPERCEDES DWG. DATED

DRAWING NO.
11C



NOTES:

1. AT A MINIMUM STREET STRUCTURAL SECTION SHALL BE DESIGNED TO CALTRANS STANDARDS.
2. STRUCTURAL SECTION DESIGN SHALL BE APPROVED BY THE CITY ENGINEER BASED UPON ENGINEERING ANALYSIS. THE ENGINEER SHALL SUBMIT CALCULATIONS.
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PAVING DETAIL
AT LIP OF GUTTER

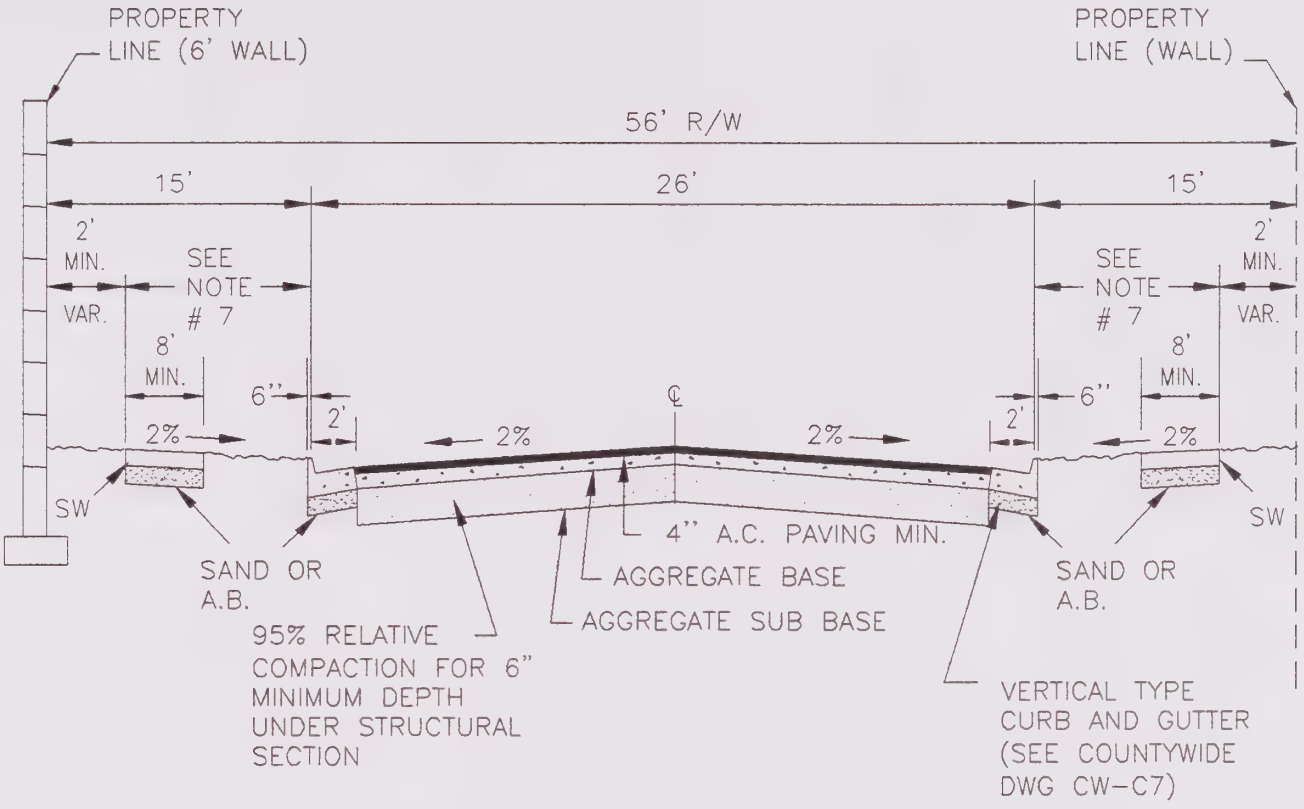
REV. NO.	REV. DATE	REV. BY
DIGITIZED	6/1/2003	
DWG. BY	SCALE	
CK. BY	NONE	

LOCAL STREET
INDUSTRIAL

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

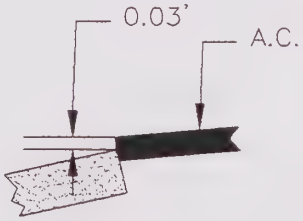
REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 11/25/03

SUPERCEDES DWG. DATED	DRAWING NO.
	11D



NOTES:

1. AT A MINIMUM STREET STRUCTURAL SECTION SHALL BE DESIGNED TO CALTRANS STANDARDS.
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4. TILL THROUGH PARKWAY AREA PRIOR TO PLANTING.
5. REFER TO STANDARD DRAWING NO. 14A FOR MINIMUM DESIGN TRAFFIC INDEX AND APPLICABLE AVERAGE DAILY TRAFFIC RANGE.
6. ON-STREET PARKING IS PROHIBITED FOR THIS STREET TYPE.
7. MEANDERING SIDEWALK MAINTAIN 2'-0" MINIMUM FROM PROPERTY LINE.



PAVING DETAIL
AT LIP OF GUTTER

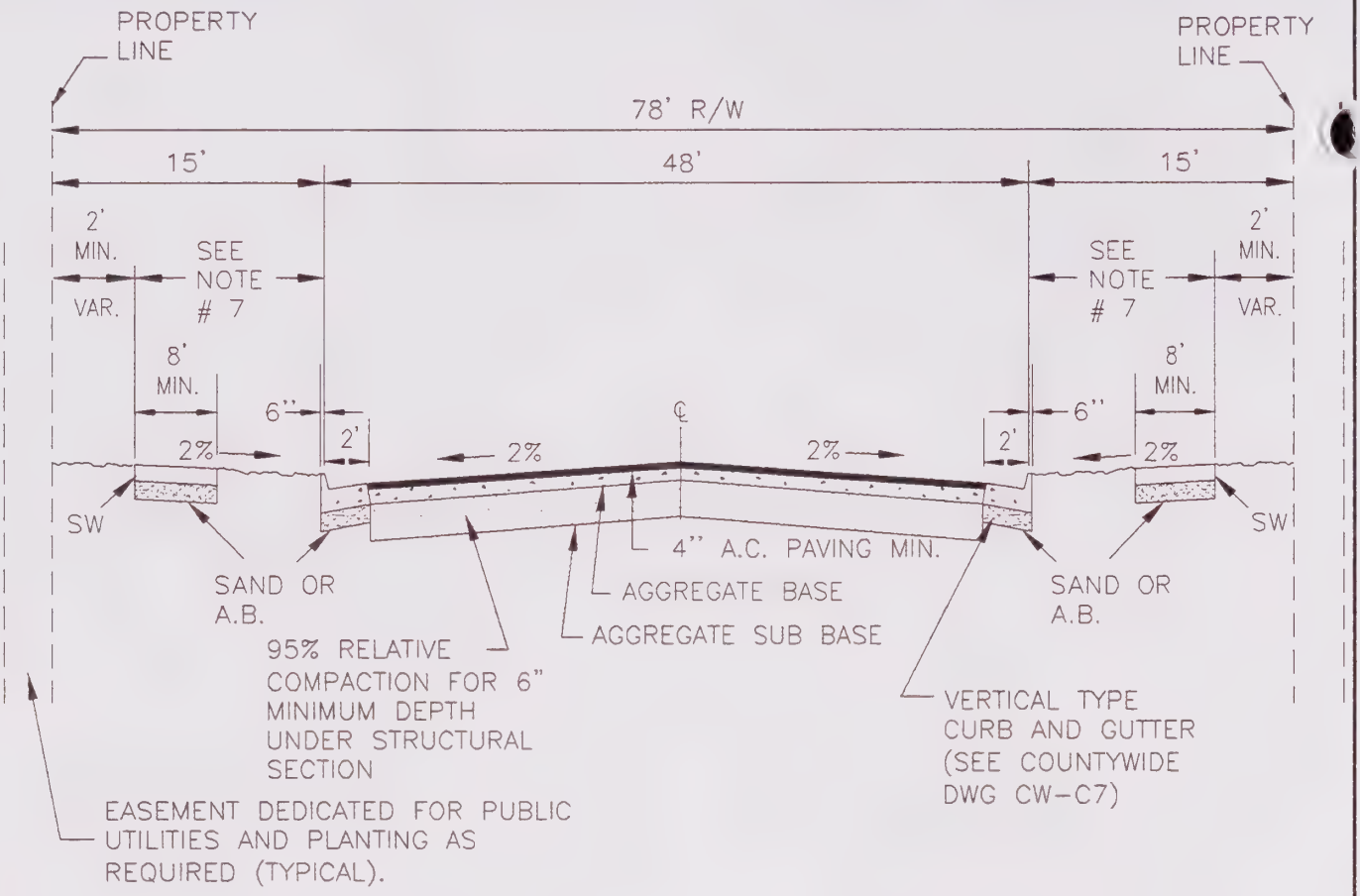
REV. NO.	REV. DATE	REV. BY
DIGITIZED	6/1/2003	
DWG. BY	SCALE	
CK. BY	NONE	

COLLECTOR STREET
BACK-UP RESIDENTIAL

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

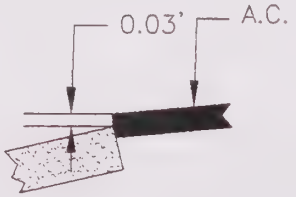
REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 11/25/03

SUPERCEDES DWG. DATED	DRAWING NO.
	11E



NOTES:

1. AT A MINIMUM STREET STRUCTURAL SECTION SHALL BE DESIGNED TO CALTRANS STANDARDS.
2. STRUCTURAL SECTION DESIGN SHALL BE APPROVED BY THE CITY ENGINEER BASED UPON ENGINEERING ANALYSIS. THE ENGINEER SHALL SUBMIT CALCULATIONS.
3. LONGITUDINAL GUTTER SLOPE SHALL BE A MINIMUM OF 0.35%.
4. TILL THROUGH PARKWAY AREA PRIOR TO PLANTING.
5. INSTALL TWO 4" DIAMETER SCHEDULE 40 SLEEVES PER LOT (3 FOR CORNER LOT) WITH CAPS UNDER SIDEWALK ACROSS LOT FRONTAGE FOR FUTURE IRRIGATION.
6. REFER TO STANDARD DRAWING NO. 14A FOR MINIMUM DESIGN TRAFFIC INDEX AND APPLICABLE AVERAGE DAILY TRAFFIC RANGE.
7. MEANDERING SIDEWALK MAINTAIN 2'-0" MINIMUM FROM PROPERTY LINE.



PAVING DETAIL
AT LIP OF GUTTER

REV. NO.	REV. DATE	REV. BY
DIGITIZED	6/1/2003	
DWG. BY	SCALE	
CK. BY	NONE	

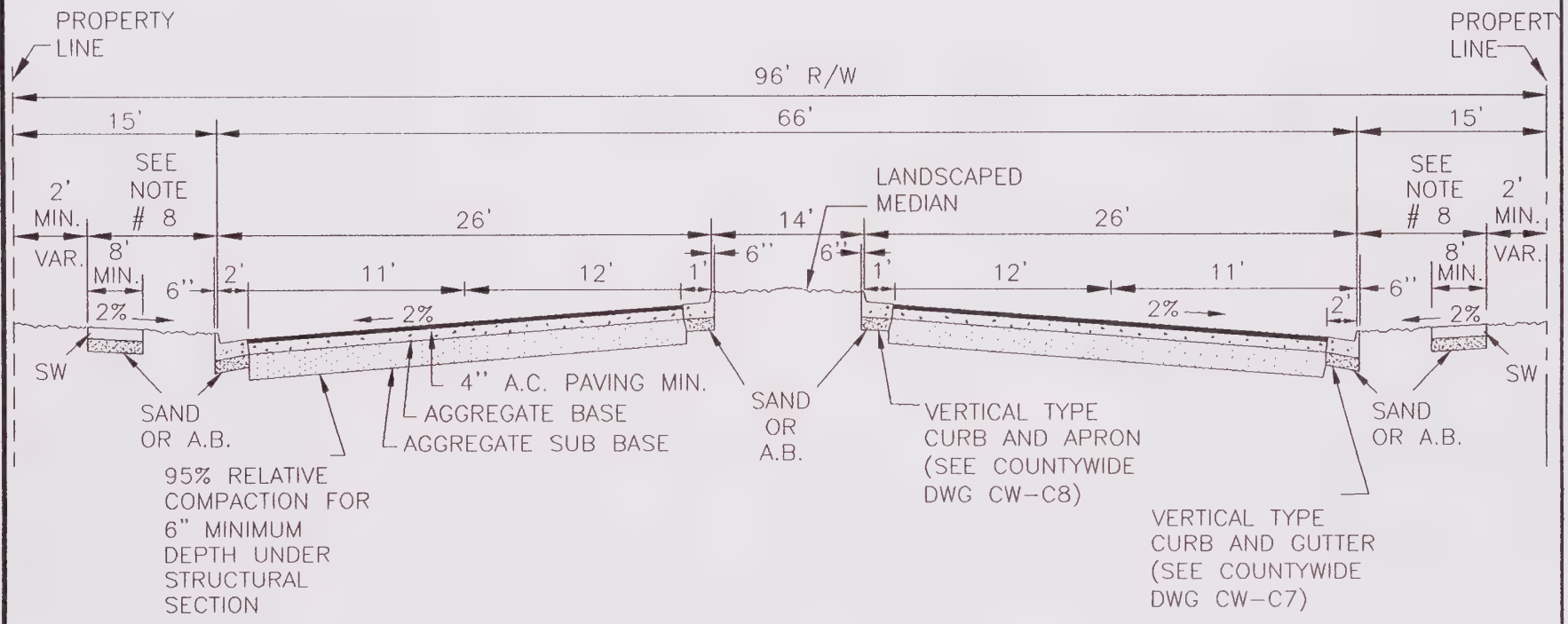
COLLECTOR STREET NON-RESIDENTIAL

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 11/25/03

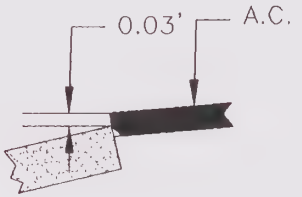
SUPERCEDES DWG. DATED

DRAWING NO. 11F



NOTES:

1. AT A MINIMUM STREET STRUCTURAL SECTION SHALL BE DESIGNED TO CALTRANS STANDARDS.
2. STRUCTURAL SECTION DESIGN SHALL BE APPROVED BY THE CITY ENGINEER BASED UPON ENGINEERING ANALYSIS. THE ENGINEER SHALL SUBMIT CALCULATIONS.
3. LONGITUDINAL GUTTER SLOPE SHALL BE A MINIMUM OF 0.35%.
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6. REFER TO STANDARD DRAWING NO. 14A FOR MINIMUM DESIGN TRAFFIC INDEX AND APPLICABLE AVERAGE DAILY TRAFFIC RANGE.
7. ON-STREET PARKING IS PROHIBITED FOR THIS STREET TYPE.
8. MEANDERING SIDEWALK MAINTAIN 2'-0" MINIMUM FROM PROPERTY LINE.



PAVING DETAIL AT LIP OF GUTTER

MINOR ARTERIAL STREET

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

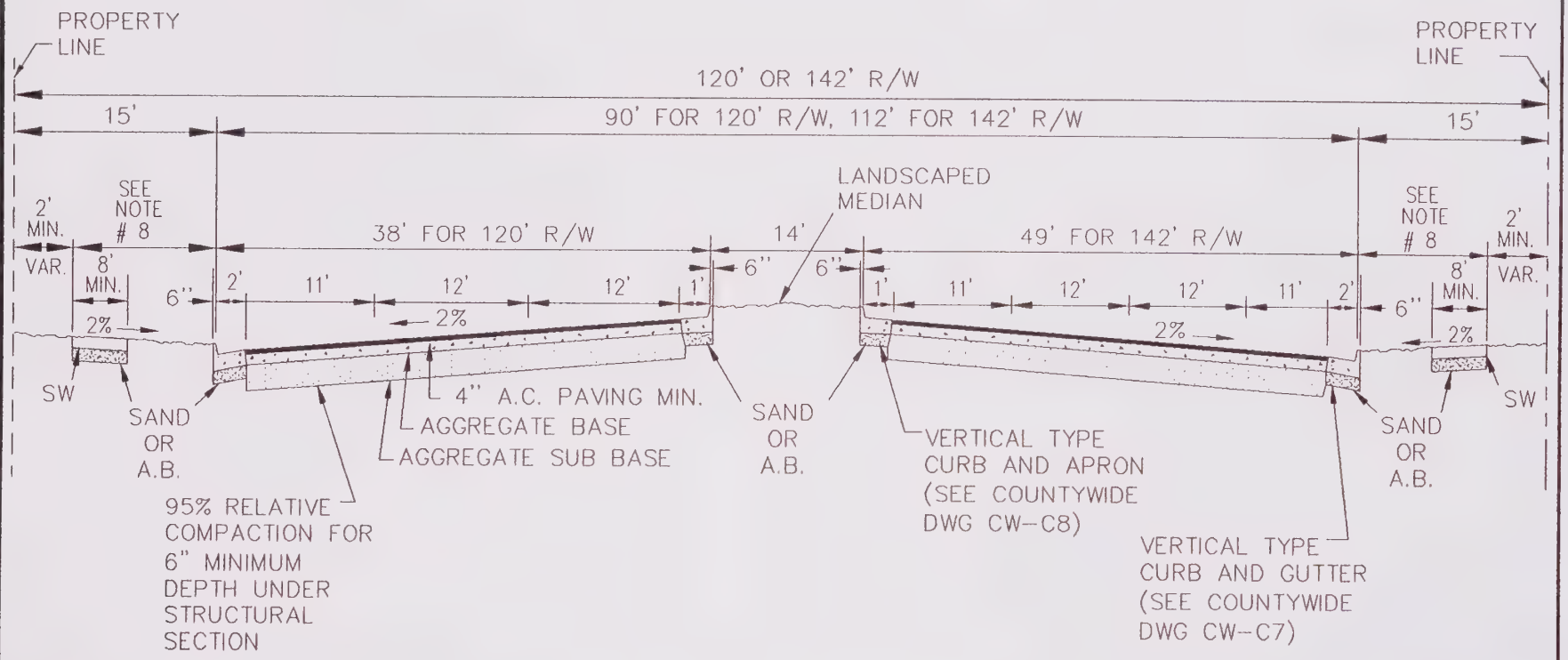
REV. NO.	REV. DATE	REV. BY

DIGITIZED 6/1/2003
DWG. BY
CK. BY
SCALE NONE

REVISION APPROVED BY CITY ENGINEER
Findon J. O'Regan
DATE: 11/25/03

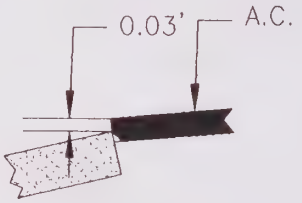
SUPERCEDES DWG. DATED

DRAWING NO. 11G



NOTES:

1. AT A MINIMUM STREET STRUCTURAL SECTION SHALL BE DESIGNED TO CALTRANS STANDARDS.
2. STRUCTURAL SECTION DESIGN SHALL BE APPROVED BY THE CITY ENGINEER BASED UPON ENGINEERING ANALYSIS. THE ENGINEER SHALL SUBMIT CALCULATIONS.
3. LONGITUDINAL GUTTER SLOPE SHALL BE A MINIMUM OF 0.35%.
4. TILL THROUGH PARKWAY AREA PRIOR TO PLANTING.
5. INSTALL TWO 4" DIAMETER SCHEDULE 40 SLEEVES PER LOT (3 FOR CORNER LOT) WITH CAPS UNDER SIDEWALK ACROSS LOT FRONTAGE FOR FUTURE IRRIGATION.
6. REFER TO STANDARD DRAWING NO. 14A FOR MINIMUM DESIGN TRAFFIC INDEX AND APPLICABLE AVERAGE DAILY TRAFFIC RANGE.
7. ON-STREET PARKING IS PROHIBITED FOR THIS STREET TYPE.
8. MEANDERING SIDEWALK MAINTAIN 2'-0" MINIMUM FROM PROPERTY LINE.



PAVING DETAIL
AT LIP OF GUTTER

MAJOR ARTERIAL STREET

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

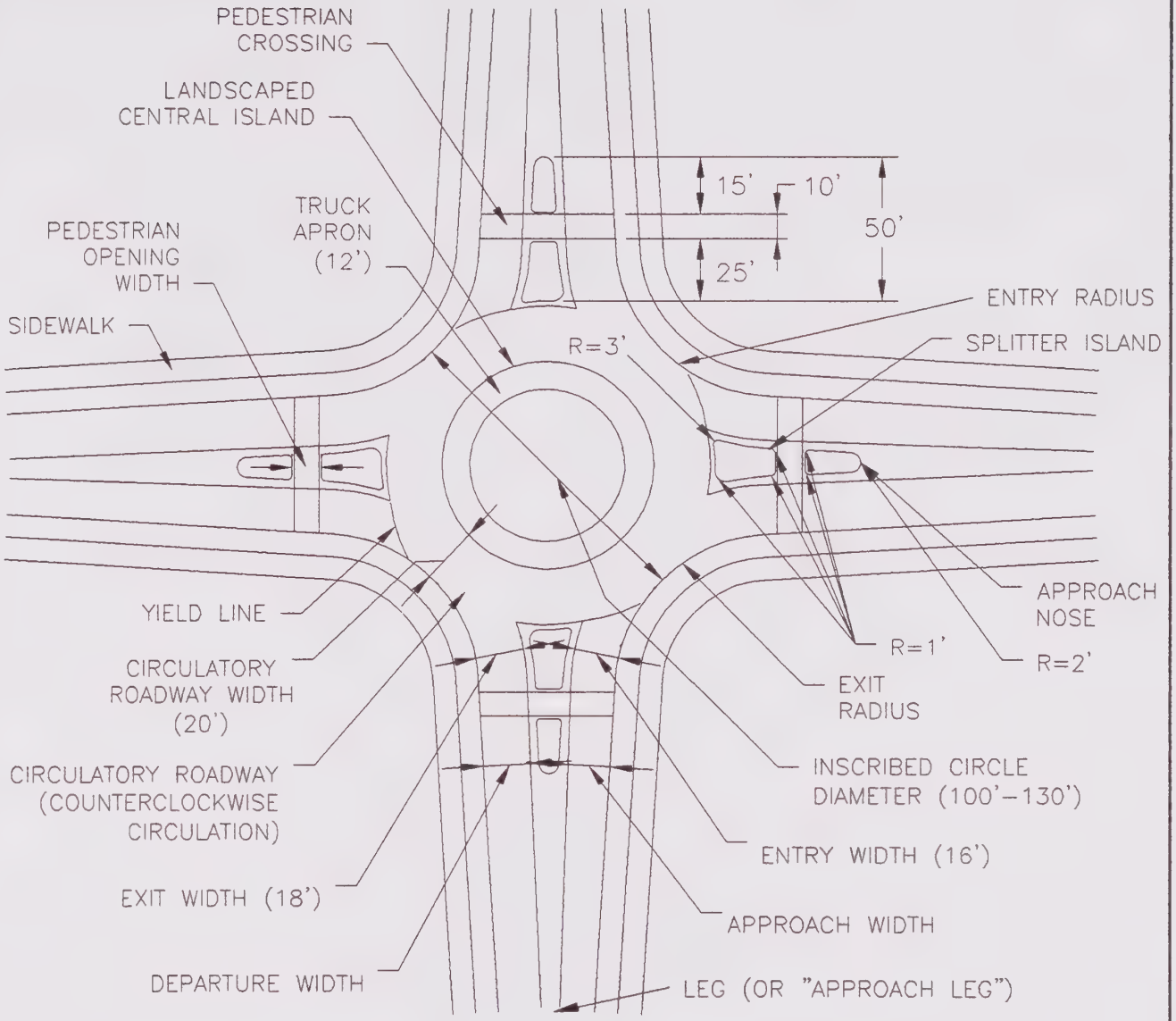
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DIGITIZED 6/1/2003
DWG. BY
CK. BY
SCALE NONE

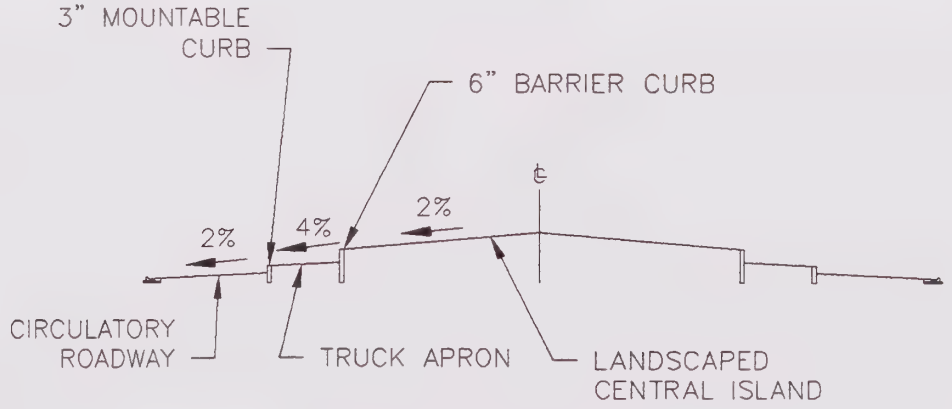
REVISION APPROVED BY CITY ENGINEER
DATE: 11/25/03

SUPERCEDES DWG. DATED

DRAWING NO. 11H



PLAN VIEW



CROSS SECTION

REV. NO.	REV. DATE	REV. BY
DIGITIZED	6/1/2003	
DWG. BY	SCALE	
CK. BY	NONE	

TYPICAL URBAN SINGLE ROUNDABOUT

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 11/25/03

SUPERCEDES DWG. DATED

DRAWING NO. 12A

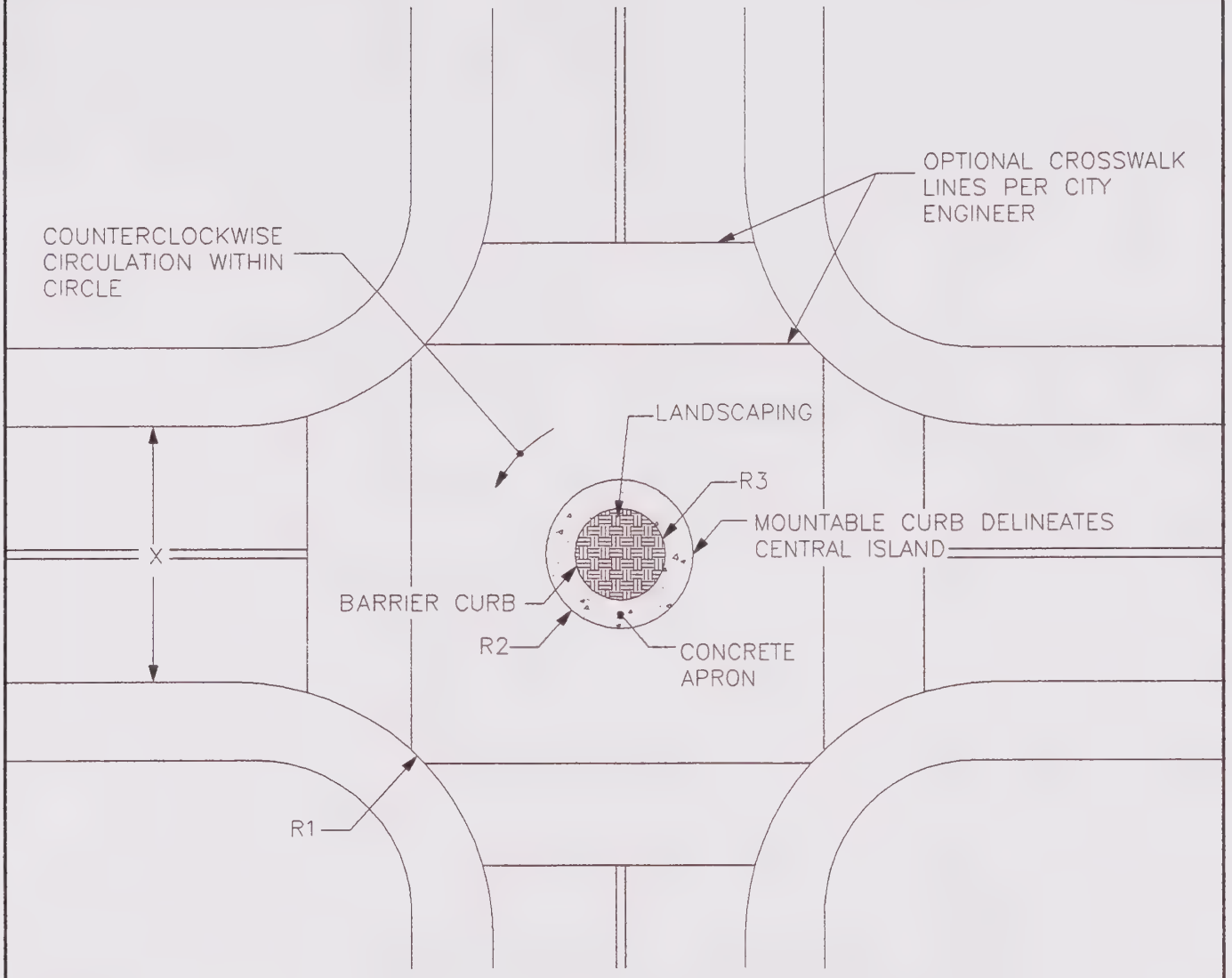
DESIGN AND OPERATIONAL CHARACTERISTICS FOR TWO ROUNDABOUT CATEGORIES

DESIGN ELEMENT	URBAN SINGLE-LANE	URBAN DOUBLE-LANE
RECOMMENDED MAXIMUM ENTRY DESIGN SPEED (MILES/HOUR)	20	20
MAXIMUM NUMBER OF ENTERING LANES PER APPROACH	1	2
TYPICAL INSCRIBED CIRCLE DIAMETER (FEET) (1)	100–130	150–180
SPLITTER ISLAND TREATMENT	RAISED WITH CROSSWALK CUT	RAISED WITH CROSSWALK CUT
TYPICAL DAILY SERVICE VOLUMES ON 4–LEG ROUNDABOUT (VEHICLES/DAY)	20,000	VARIES (2)

NOTES:

(1) A ROUNDABOUT WILL BE REQUIRED WHERE TWO COLLECTOR STREETS INTERSECT AND THE ULTIMATE COMBINED ENTERING TRAFFIC VOLUMES EXCEED 2,000 VEHICLES DAILY. A TRAFFIC SIGNAL MAY BE REQUIRED IN LIEU OF A ROUNDABOUT AT THE DISCRETION OF THE PUBLIC WORKS DIRECTOR.
(2) WHEN DESIGNING ROUNDABOUTS, REFER TO "ROUNDABOUT: AN INFORMATIONAL GUIDE," FHWA, 2000.
(3) DRAWING 12A SHOWS TYPICAL DIMENSIONS TO ACCOMMODATE A WB–50 VEHICLE WITHIN A SINGLE LANE ROUNDABOUT.
(4) ASSUME 90–DEGREE ENTRIES AND NO MORE THAN FOUR LEGS.
(5) SIGNAGE SHALL CONFORM TO "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES."
(6) ROUNDABOUT DESIGN SHALL BE APPROVED BY THE CITY ENGINEER BASED ON ENGINEERING ANALYSIS.

REV. NO.	REV. DATE	REV. BY	TYPICAL ROUNDABOUT TABLE	REVISION APPROVED BY CITY ENGINEER Finbar J. O'Regan DATE: 11/25/03	
DIGITIZED 6/1/2003					
DWG. BY	SCALE		CITY OF STOCKTON DEPARTMENT OF PUBLIC WORKS	SUPERSEDES DWG. DATED	DRAWING NO. 12B
CK. BY	NONE				



PLAN VIEW

NOTES:

1. SEE TABLE ON THIS PAGE FOR DESIGN CHARACTERISTICS FOR THREE TRAFFIC CATEGORIES.
2. TRAFFIC CIRCLE DESIGN AND SIGNAGE SHALL BE APPROVED BY THE CITY ENGINEER BASED UPON ENGINEERING ANALYSIS.
3. A TRAFFIC CIRCLE WILL BE REQUIRED WHERE TWO LOCAL STREETS INTERSECTION AND THE ULTIMATE COMBINED ENTERING TRAFFIC EXCEEDS 1,000 VEHICLES DAILY OR THE UNIMPEDED DISTANCE OR ANY OF THE APPROACHES NOT SUBJECT TO STOP CONTROL EXCEEDS 600 FEET. THIS REQUIREMENT MAY BE WAIVED AT THE DISCRETION OF THE PUBLIC WORKS DIRECTOR.

FOR THIS STREET WIDTH	USE THESE CURB RADII		
X	R1	R2	R3
34'	20'	20'	8'
	25'	24'	8'
32'	15'	12'	7'
	20'	18'	7'
	25'	20'	7'
30'	15'	11'	6'
	20'	15'	6'
	25'	16'	6'

REV. NO.	REV. DATE	REV. BY

DIGITIZED 6/1/2003

DWG. BY

CK. BY

SCALE NONE

TRAFFIC CIRCLE

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 11/25/03

SUPERCEDES DWG. DATED

DRAWING NO. 13

ITEM	LOCAL STREET				COLLECTOR STREET		ARTERIAL STREET	
	LOW VOLUME RESIDENTIAL	MEDIUM VOLUME RESIDENTIAL	COMMERCIAL	INDUSTRIAL	BACK-UP RESIDENTIAL	NON RESIDENTIAL	MINOR ARTERIAL	MAJOR ARTERIAL
AVERAGE DAILY TRAFFIC (ADT)	0–750	750–1,500	< 5,000	< 5,000	1,500–5,000	< 13,000	< 25,000	≥ 25,000
NUMBER OF TRAVEL LANES	2	2	2	2	2	2	4	6–8
WIDTH, CURB–TO–CURB (FEET)	30	32	34	40	26	48	66	90–112
ON–STREET PARKING ALLOWED?	YES	YES	YES	YES	NO	YES	NO	NO
PARKING LANE WIDTH (FEET)	7	7	7	8	NONE	8	NONE	NONE
TRAVEL LANE WIDTH (FEET)	8	9	10	12	13	11	11–14	11–15
LEFT–TURN LANE WIDTH (FEET)	NONE	NONE	NONE	NONE	NONE	10	10–12	10–12
RAISED MEDIAN (14 FEET)?	NO	NO	NO	NO	NO	NO	YES	YES
BLOCK LENGTH (FEET)	600	800	800	800	1,000	1,000	1,300	1,300
MINIMUM SIDEWALK WIDTH (FEET)	4	4	4/4.5 (1)	4/4.5 (1)	8	8	8	8
SIDEWALK BICYCLE PATH REQUIRED?	NO	NO	NO	NO	YES	YES	YES (2)	YES (2)
LANDSCAPE STRIP REQUIRED?	YES	YES	OPTIONAL	OPTIONAL	YES	YES	YES	YES
LANDSCAPE STRIP WIDTH (FEET)	6	6	6	6	15 (3)	15 (3)	15 (3)	15 (3)
MINIMUM TRAFFIC INDEX (4)	5	5	6	7	6	5	7	7

NOTES:

1. LOCAL STREET–COMMERCIAL AND LOCAL STREET INDUSTRIAL STREETS SHALL HAVE MINIMUM 4'–0" WIDE DETACHED OR MINIMUM 4'–6" ATTACHED SIDEWALKS.
2. BICYCLE LANES MAY BE REQUIRED ON ARTERIAL ROADWAYS IN LIEU OF SIDEWALK BICYCLE PATHS AT THE DISCRETION OF THE PUBLIC WORKS DIRECTOR.
3. LANDSCAPE STRIP WIDTHS FOR COLLECTOR AND ARTERIAL STREETS. INCLUDE PROVISION FOR SIDEWALK.
4. TRAFFIC INDEXES ARE MINIMUM. IF STREET IS A FEDERAL–AID URBAN STREET AND A DESIGNATED TRUCK ROUTE OR BUS ROUTE, TRAFFIC INDEX SHALL BE DETERMINED BY CITY ENGINEER.

REV. NO. | REV. DATE | REV. BY

DIGITIZED 6/1/2003

DWG. BY

CK. BY

SCALE NONE

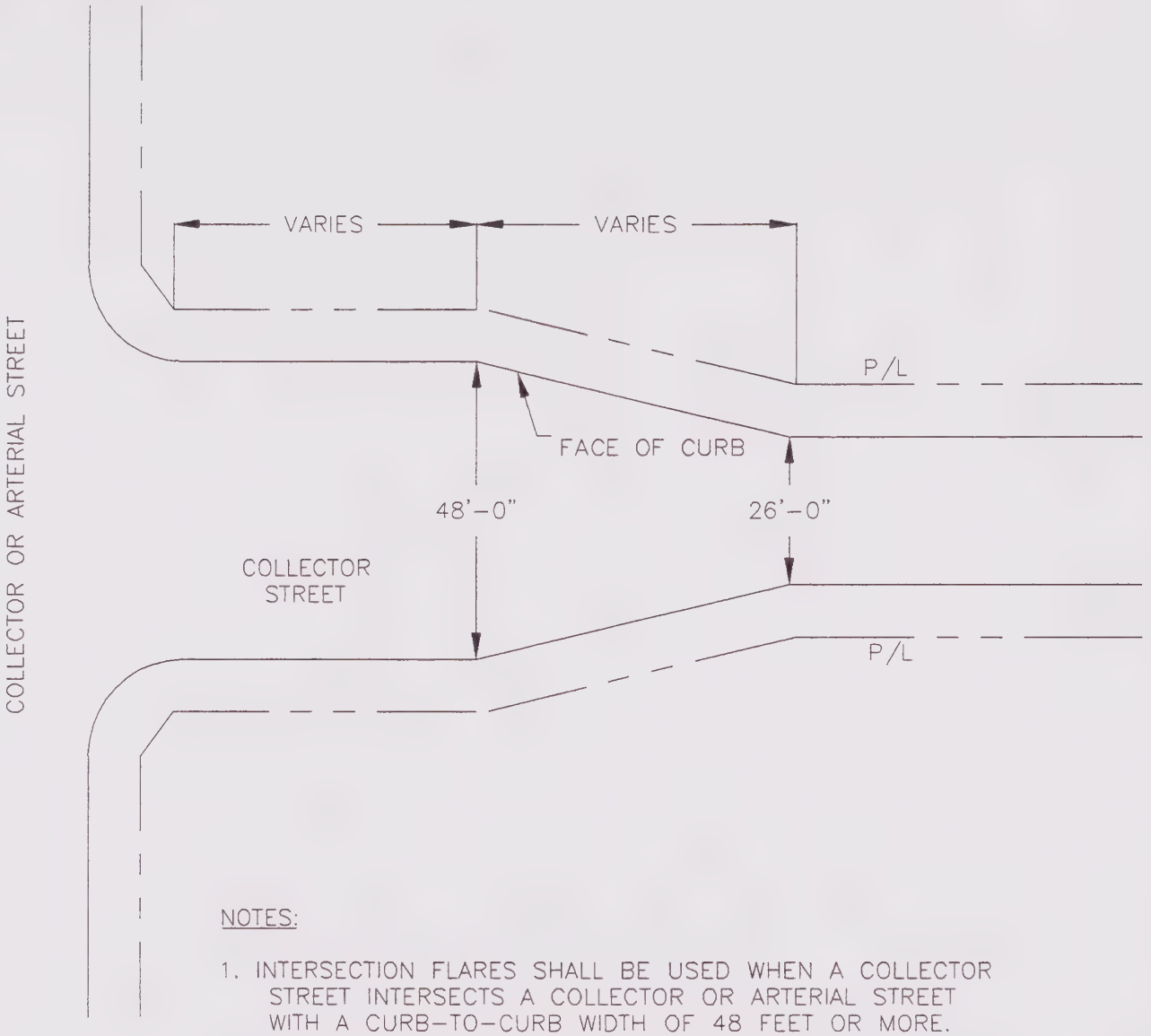
CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

STREET REQUIREMENTS

SUPERCEDES DWG. DATED

REVISION APPROVED BY CITY ENGINEER
Lindon J. O'Kegan
DATE: 11/25/03

DRAWING NO. 14A



NOTES:

1. INTERSECTION FLARES SHALL BE USED WHEN A COLLECTOR STREET INTERSECTS A COLLECTOR OR ARTERIAL STREET WITH A CURB-TO-CURB WIDTH OF 48 FEET OR MORE.
2. INTERSECTION DESIGN SHALL BE APPROVED BY THE CITY ENGINEER.

REV. NO.	REV. DATE	REV. BY	INTERSECTION DESIGN	DIGITIZED VERSION APPROVED BY CITY ENGINEER
			USE OF FLARES	Finbar J. O'Regan
DIGITIZED	6/1/2003			DATE: 11/25/03
DWG. BY	SCALE		CITY OF STOCKTON	SUPERCEDES DWG. DATED / DRAWING NO.
CK. BY	NONE		DEPARTMENT OF PUBLIC WORKS	14B

THE FOLLOWING MINIMUM CURB RADII SHALL BE USED AT THE INTERSECTION OF STREETS:

STREET TYPE	LOCAL STREET, LOW VOLUME RESIDENTIAL	LOCAL STREET, MEDIUM VOLUME RESIDENTIAL	LOCAL STREET, COMMERCIAL	LOCAL STREET, INDUSTRIAL	COLLECTOR STREET, BACK-UP RESIDENTIAL	COLLECTOR STREET, NON-RESIDENTIAL	ARTERIAL STREET, MINOR ARTERIAL	ARTERIAL STREET, MAJOR ARTERIAL
LOCAL STREET, LOW VOLUME RESIDENTIAL	15'	15'	20'	30'	15'	25'	30'	30'
LOCAL STREET, MEDIUM VOLUME RESIDENTIAL	15'	15'	20'	30'	15'	25'	30'	30'
LOCAL STREET, COMMERCIAL	20'	20'	20'	30'	20'	30'	30'	30'
LOCAL STREET, INDUSTRIAL	30'	30'	30'	30'	30'	30'	50'	50'
COLLECTOR STREET, BACK-UP RESIDENTIAL	15'	15'	20'	30'	15'	25'	30'	30'
COLLECTOR STREET, NON-RESIDENTIAL	25'	25'	30'	30'	25'	25'	50'	50'
ARTERIAL STREET, MINOR ARTERIAL	30'	30'	30'	50'	30'	50'	30'	30'
ARTERIAL STREET, MAJOR ARTERIAL	30'	30'	30'	50'	30'	50'	30'	30'

REV. NO.	REV. DATE	REV. BY

DIGITIZED 6/1/2003

DWG. BY

CK. BY

SCALE NONE

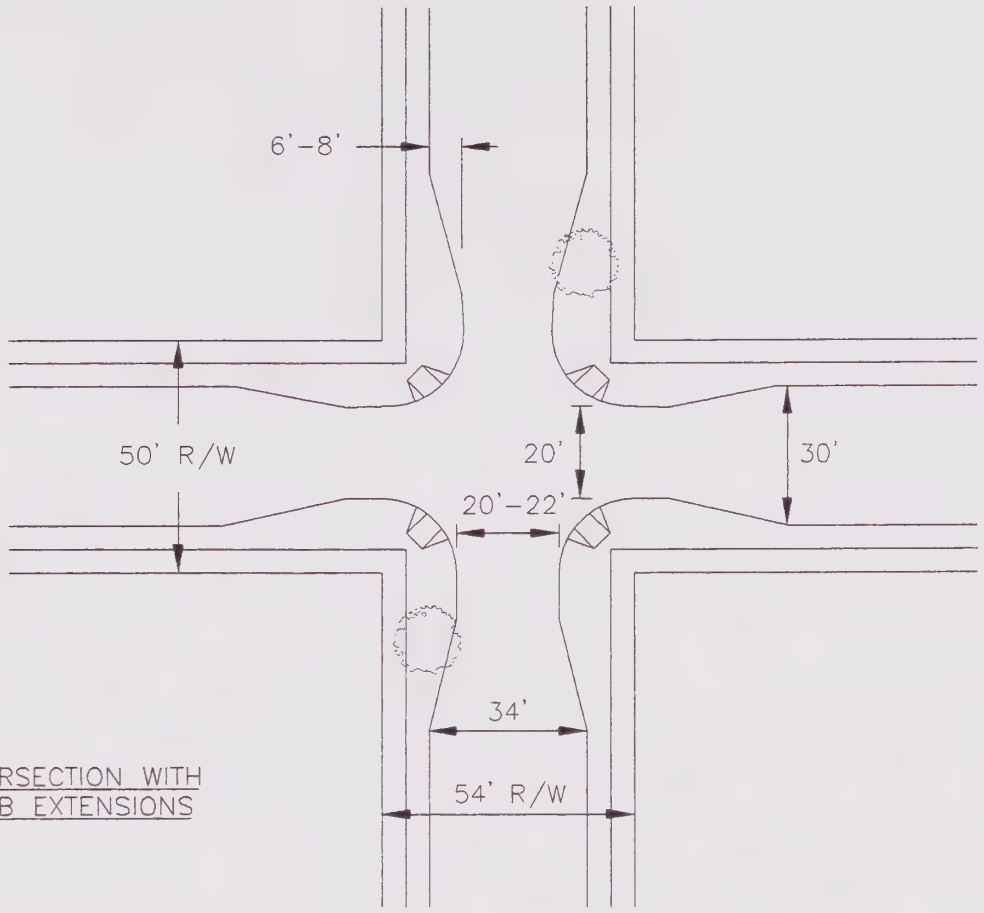
CURB RETURN RADII

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 11/25/03

SUPERCEDES DWG. DATED

DRAWING NO. 14C



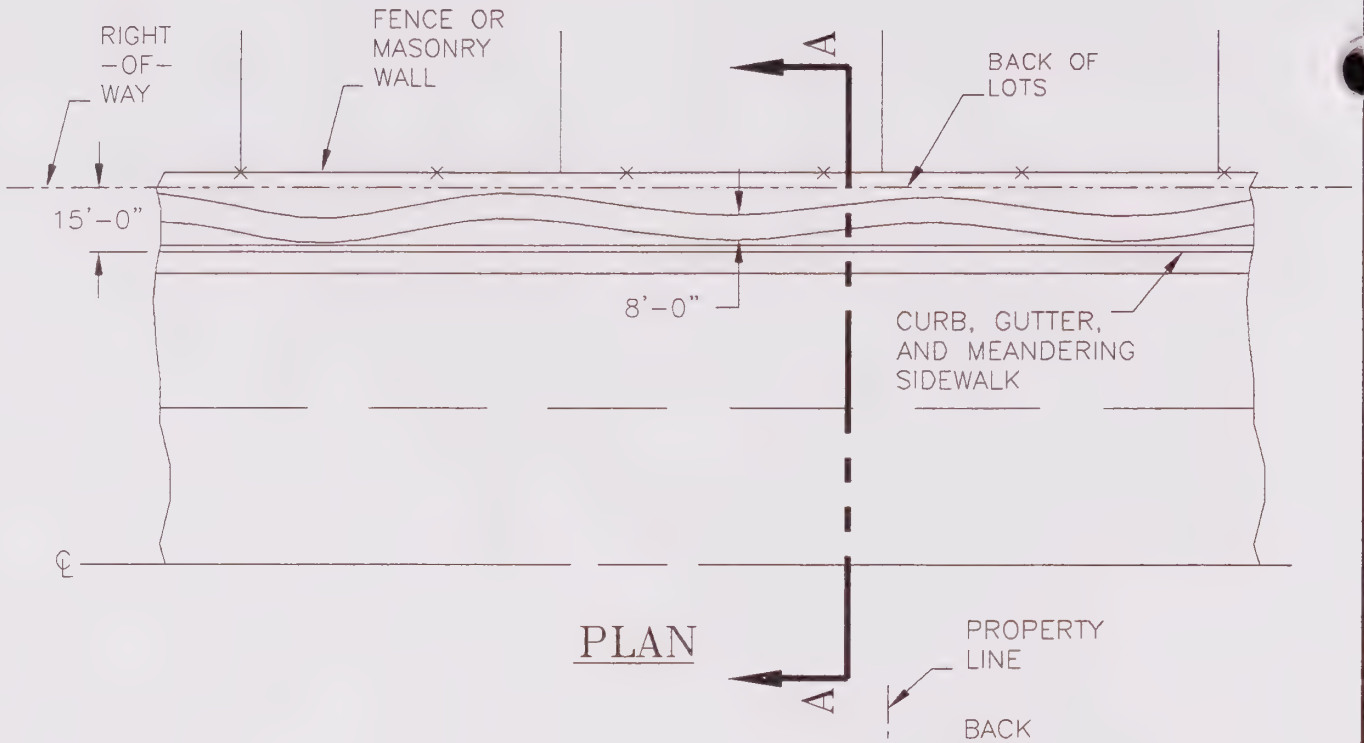
INTERSECTION WITH CURB EXTENSIONS

NOTES:

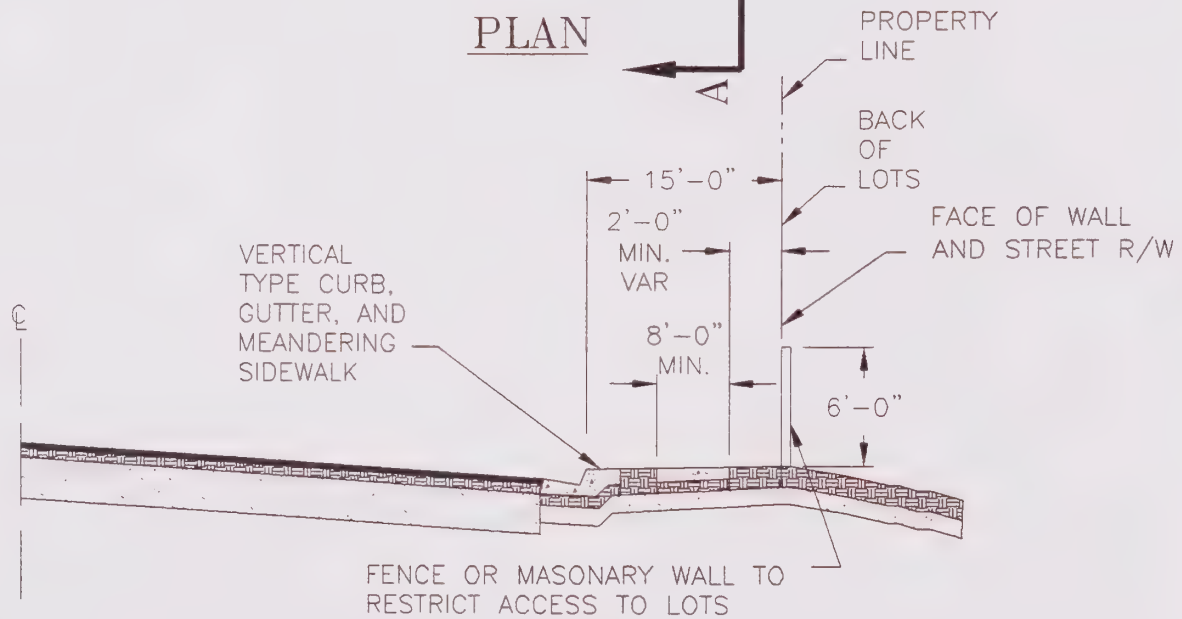
1. CURB EXTENSIONS (BULB-OUTS) MAY BE INSTALLED TO REDUCE PEDESTRIAN CROSSING DISTANCES AT INTERSECTIONS, SUBJECT TO THE APPROVAL OF THE CITY ENGINEER.
2. CURB EXTENSIONS SHALL NOT IMPEDE THE MOVEMENT OF EMERGENCY VEHICLES OR GARBAGE TRUCKS. AN ENGINEERING ANALYSIS OF VEHICLE TURNING MOVEMENTS SHALL BE PREPARED.
3. WHERE A LOCAL STREET INTERSECTS A COLLECTOR OR ARTERIAL STREET, THE DESIGN AND PLACEMENT OF CURB EXTENSIONS SHALL NOT RESULT IN SIGNIFICANT IMPACTS TO TRAFFIC CIRCULATION ON THE COLLECTOR OR ARTERIAL STREET, AS DETERMINED BY THE CITY ENGINEER.
4. CURB EXTENSIONS SHALL NOT REDUCE THE EFFECTIVE WIDTH OF A LOCAL STREET TO LESS THAN 20 FEET AT ANY POINT.
5. INTERSECTION DESIGN SHALL BE APPROVED BY THE CITY ENGINEER.

REV. NO.	REV. DATE	REV. BY	INTERSECTION DESIGN: CURB EXTENSIONS	REVISION APPROVED BY CITY ENGINEER Finbar J. O'Regan DATE: 11/25/03
DIGITIZED 6/1/2003				
DWG. BY	SCALE		CITY OF STOCKTON DEPARTMENT OF PUBLIC WORKS	SUPERCEDES DWG. DATED / DRAWING NO. 14D
CK. BY	NONE			

SUBDIVISION



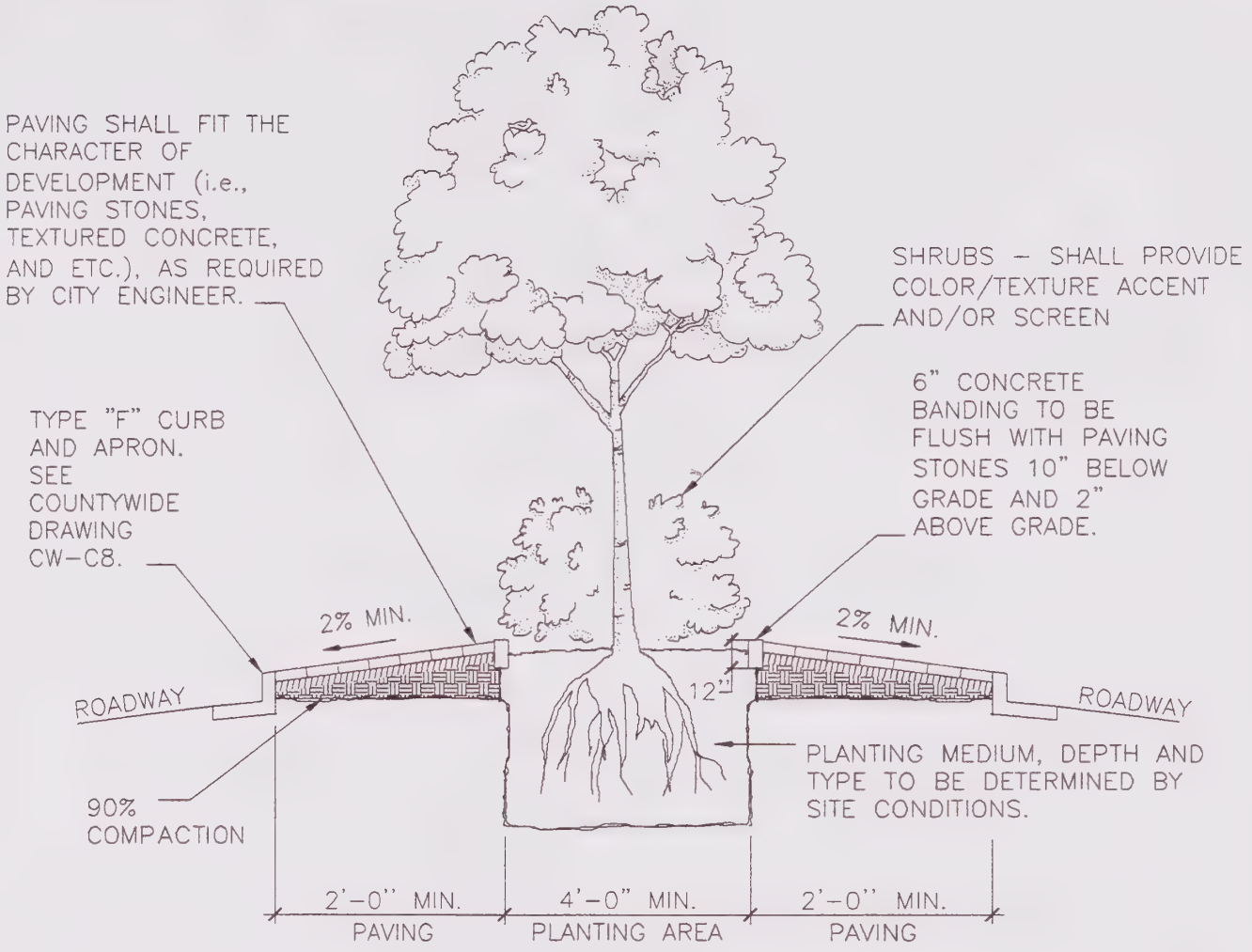
PLAN



FENCE OR MASONARY WALL TO RESTRICT ACCESS TO LOTS ADJACENT TO STREET RIGHT-OF-WAY AND PUBLIC OPEN SPACE (STANDARD DWG. NO. 125) CONSTRUCTED BY DEVELOPER/OWNER REQUIREMENTS IN ACCORDANCE WITH CITY REQUIREMENTS AND SUBJECT TO THE APPROVAL OF THE CITY ENGINEER (MAY BE WAIVED FOR COMMERCIAL DEVELOPMENT)

SECTION A-A

REV. NO.	REV. DATE	REV. BY	IMPROVEMENTS FOR BACKUP LOTS AND COMMERCIAL DEVELOPMENTS	REVISION APPROVED BY CITY ENGINEER
7	6/1/2003	HL/EA		Finbar J. O'Regan
DIGITIZED	7/1/91			DATE: 11/25/03
DWG. BY RC	SCALE		CITY OF STOCKTON	SUPERCEDES DWG. DATED
CK. BY	NONE		DEPARTMENT OF PUBLIC WORKS	01/09/02
				DRAWING NO. 15



NOTES:

1. TREES SHALL BE SELECTED FROM THE CITY'S TREE PLANTING LIST. THEY SHALL BE PLANTED A MINIMUM OF 30'-0" TO 50'-0" ON CENTER SPACING, OR MAY BE PLANTED IN GROUPS FOR AN INFORMAL PLANTING EFFECT USING THE SAME NUMBER OF TREES, AS DETERMINED BY THE CITY LANDSCAPE ARCHITECT.
2. SHRUBS SHALL BE PLANTED IN GROUPINGS TO PROVIDE A CONSISTENT PLANTING SCHEME. SHRUBS SHALL REQUIRE MINIMUM MAINTENANCE AND BE DROUGHT TOLERANT.
3. A GROUND COVER OR TURF AREA MAY BE INCLUDED BETWEEN THE PLANTING AND PAVING AREAS WHERE APPLICABLE. MAINTENANCE SHALL BE PROVIDED BY A MAINTENANCE AGREEMENT OR HOME OWNER'S ASSOCIATION.
4. COMPLETE LANDSCAPE AND IRRIGATION PLANS AND DETAILS SHALL BE SUBMITTED FOR REVIEW AND APPROVAL AS PART OF THE DEVELOPMENT PLANS. ALL DESIGN PROPOSALS SHALL BE SUBJECT TO APPROVAL BY THE CITY LANDSCAPE ARCHITECT AND THE CITY ENGINEER.

REV. NO.	REV. DATE	REV. BY
4	6/1/2000	HLE/RH
DIGITIZED	7/1/92	
DWG. BY	RC	SCALE
CK. BY		NONE

MEDIAN LANDSCAPE

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 01/09/02

SUPERCEDES DWG. DATED	DRAWING NO.
2/23/94	16

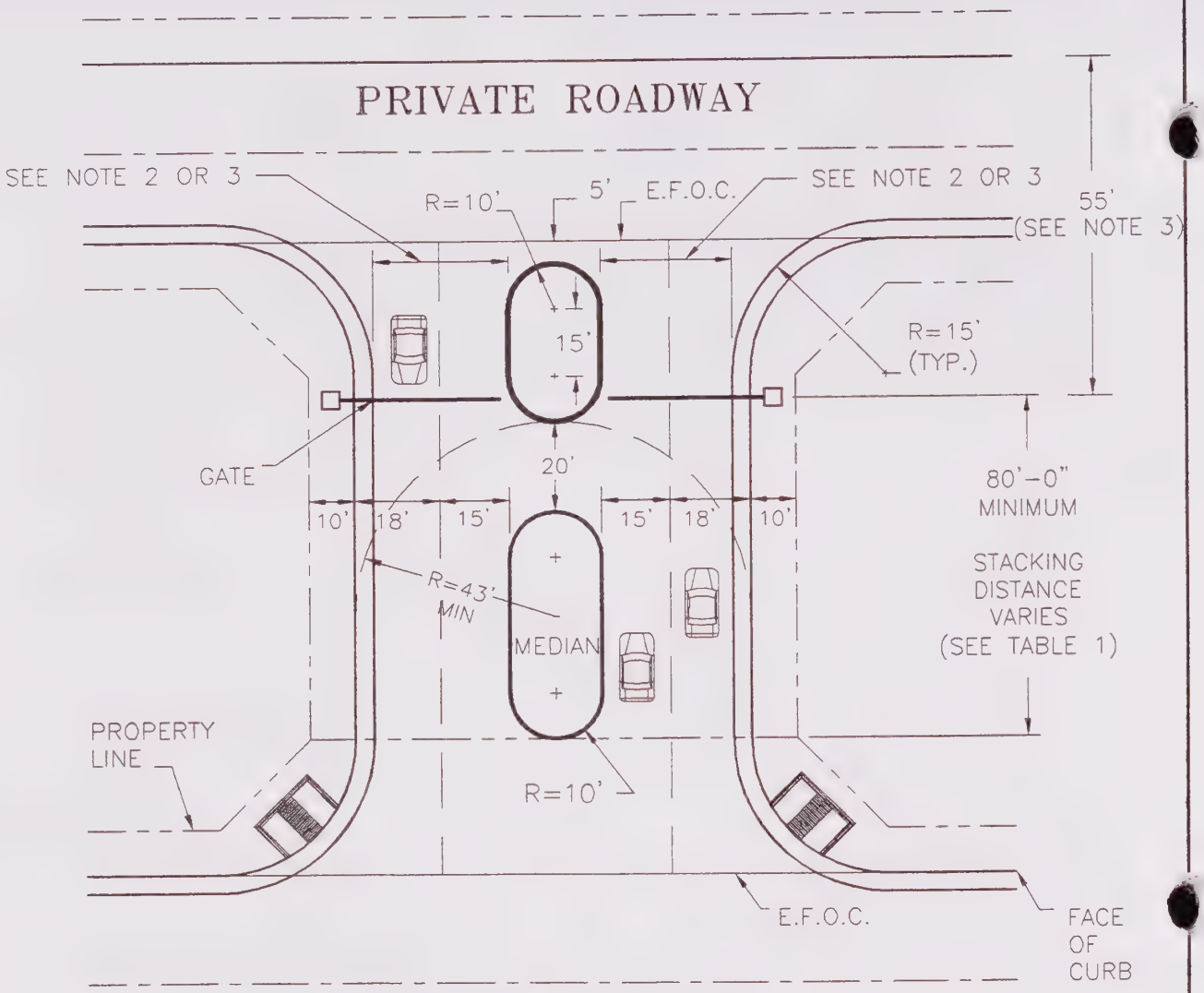


TABLE 1

# RESIDENTIAL UNITS	MINIMUM STACKING DISTANCE (FT.)
UP TO 80	80
80 AND UP TO 100	100
100 AND UP TO 120	120
120 AND UP TO 140	140
140 AND ABOVE	150

NOTES:

1. E.F.O.C. = EXTENSION FACE OF CURB
2. GATE WIDTH MAY BE REDUCED TO 20'-0" WITH CITY ENGINEER APPROVAL.
3. GATE WIDTH MAY BE REDUCED TO 16'-0" PROVIDED THAT 55'-0" OF CLEARANCE IS MAINTAINED BETWEEN THE GATE AND THE OPPOSITE FACE OF CURB.

REV. NO.	REV. DATE	REV. BY
4	6/1/2003	HL/EA
DIGITIZED	1/1/92	
DWG. BY	RC	SCALE
CK. BY		NONE

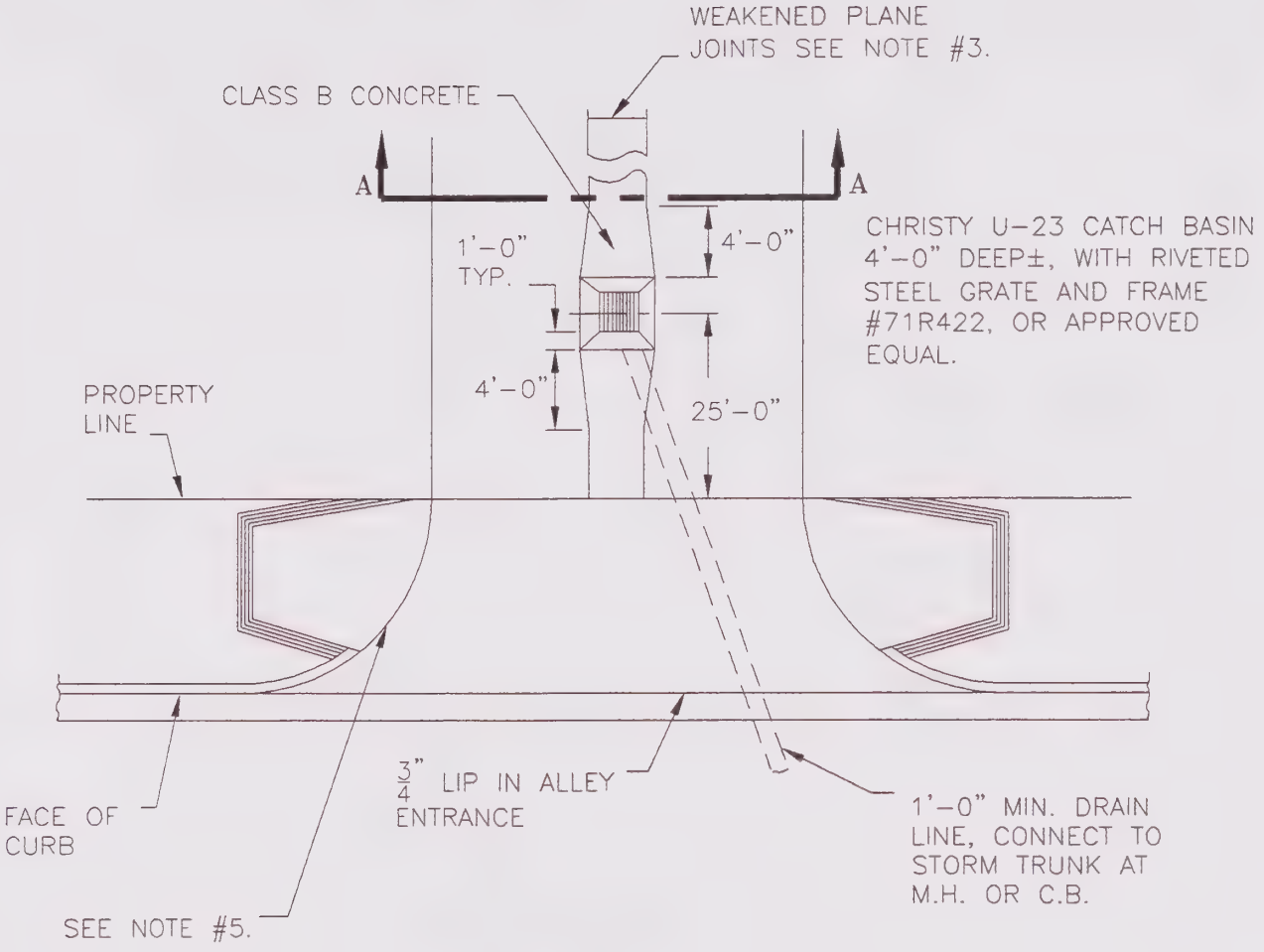
GATED RESIDENTIAL ENTRANCE

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 11/25/03

SUPERCEDES DWG. DATED 01/09/02

DRAWING NO. 17

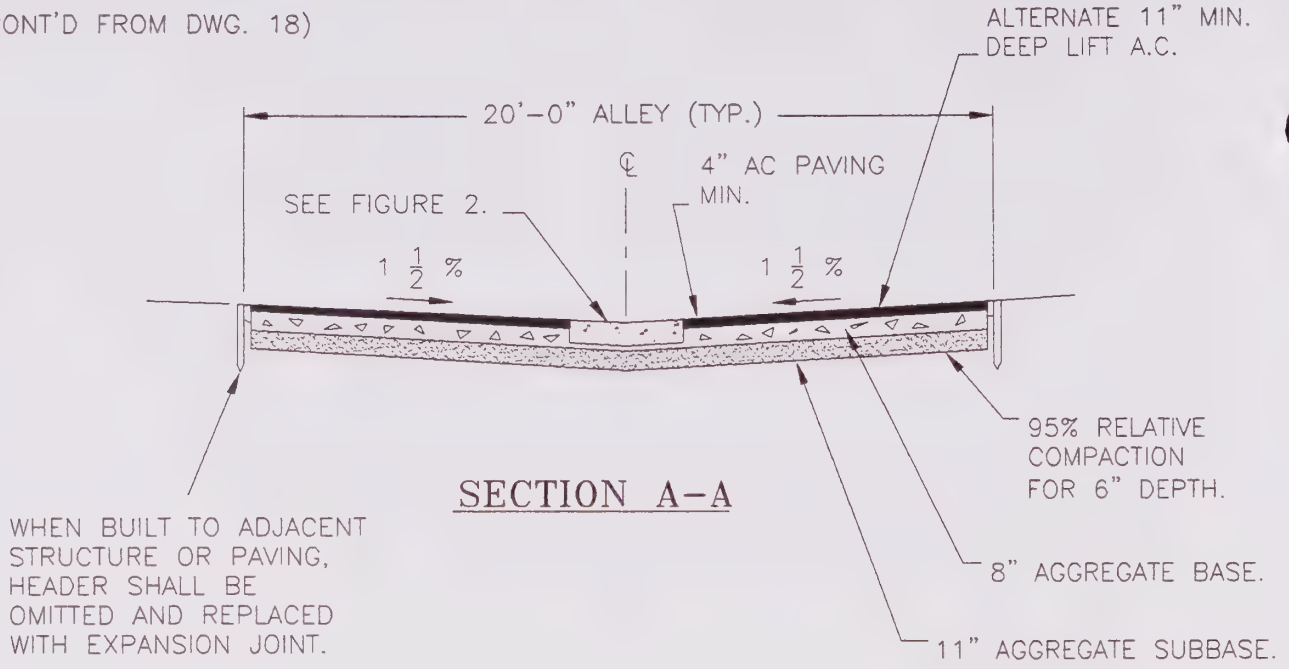


NOTES:

1. AFTER DRIVING STAKE, TOP OF STAKE TO BE CUT OFF FLUSH WITH 2"x4" HEADER (SEE DRAWING NO. 18A, FIG. 1).
2. T... 7 SHALL BE USED IN PAVEMENT DESIGN.
3. SEE DETAIL DRAWING NO. 25, FIG. 1.
4. CLASS "B" CONCRETE.
5. SEE DETAIL DRAWING NO. 38 FOR STANDARD COMMERCIAL DRIVEWAY.

REV. NO.	REV. DATE	REV. BY	TYPICAL ALLEY CONSTRUCTION	REVISION APPROVED BY CITY ENGINEER
2	6/1/2000	HLE/RH		Finbar J. O'Regan
DIGITIZED	7/1/92			DATE: 01/09/02
DWG. BY RC	SCALE		CITY OF STOCKTON	SUPERCEDES DWG. DATED
CK. BY	NONE		DEPARTMENT OF PUBLIC WORKS	7/1/92
				DRAWING NO. 18

(CONT'D FROM DWG. 18)



SECTION A-A

WHEN BUILT TO ADJACENT STRUCTURE OR PAVING, HEADER SHALL BE OMITTED AND REPLACED WITH EXPANSION JOINT.

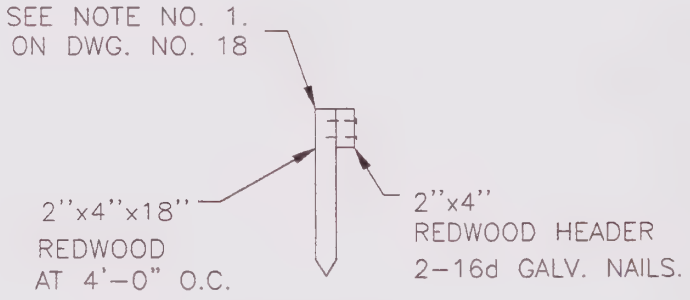


FIGURE 1.
N.T.S.

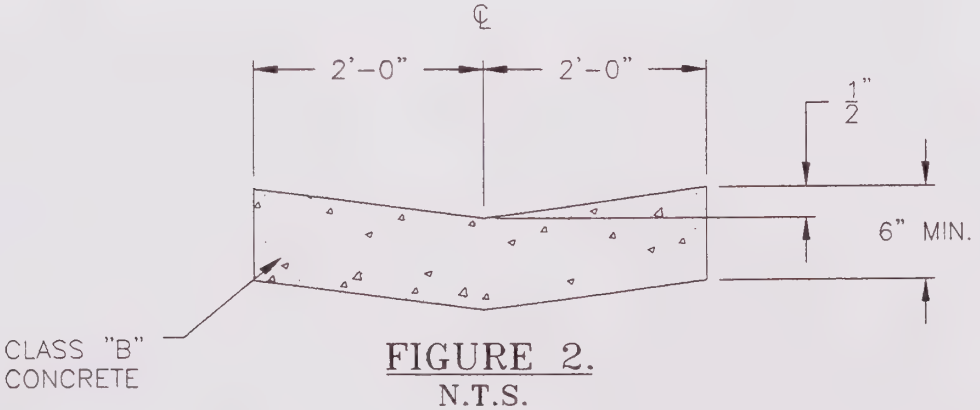


FIGURE 2.
N.T.S.

REV. NO.	REV. DATE	REV. BY
3	6/1/2000	HLE/RH
DIGITIZED	7/1/92	
DWG. BY	RC	SCALE
CK. BY		NONE

TYPICAL ALLEY CONSTRUCTION

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 01/09/02

SUPERCEDES DWG. DATED 7/1/92

DRAWING NO. 18A

	W=50'	W=60'
Δ_2	7° 00' 00"	10° 14' 11"
R_2	20'	30'
R_3	R_4 + 7'	R_4 + 10'
X	56.04'	61.64'
R_5	93'	90'

CURVE DATA

Δ_1 = VARIABLE

$\Delta_2 = \text{TAN}^{-1}\left(\frac{W+7}{50}\right) - \text{TAN}^{-1}\left(\frac{W}{X}\right)$ (FOR W=50')

$= \text{TAN}^{-1}\left(\frac{W+10}{50}\right) - \text{TAN}^{-1}\left(\frac{W}{X}\right)$ (FOR W=60')

$\Delta_3 = \Delta_1 + 2\Delta_2$

$R_4 = W$

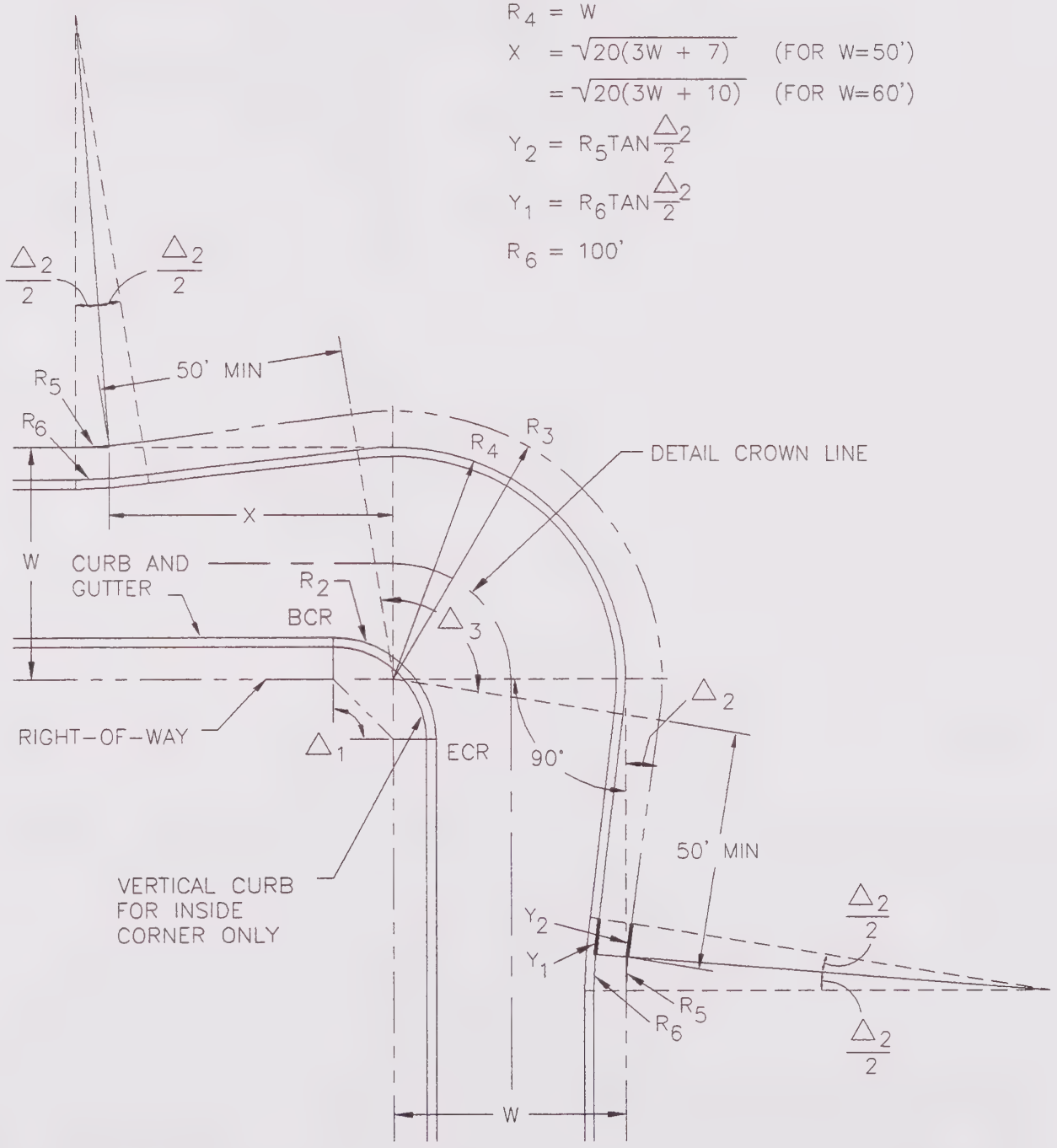
$X = \sqrt{20(3W + 7)}$ (FOR W=50')

$= \sqrt{20(3W + 10)}$ (FOR W=60')

$Y_2 = R_5 \text{TAN}\frac{\Delta_2}{2}$

$Y_1 = R_6 \text{TAN}\frac{\Delta_2}{2}$

R_6 = 100'



REV. NO.	REV. DATE	REV. BY
2	6/1/2000	HLE/RH
DIGITIZED	7/1/92	
DWG. BY	RC	SCALE
CK. BY		NONE

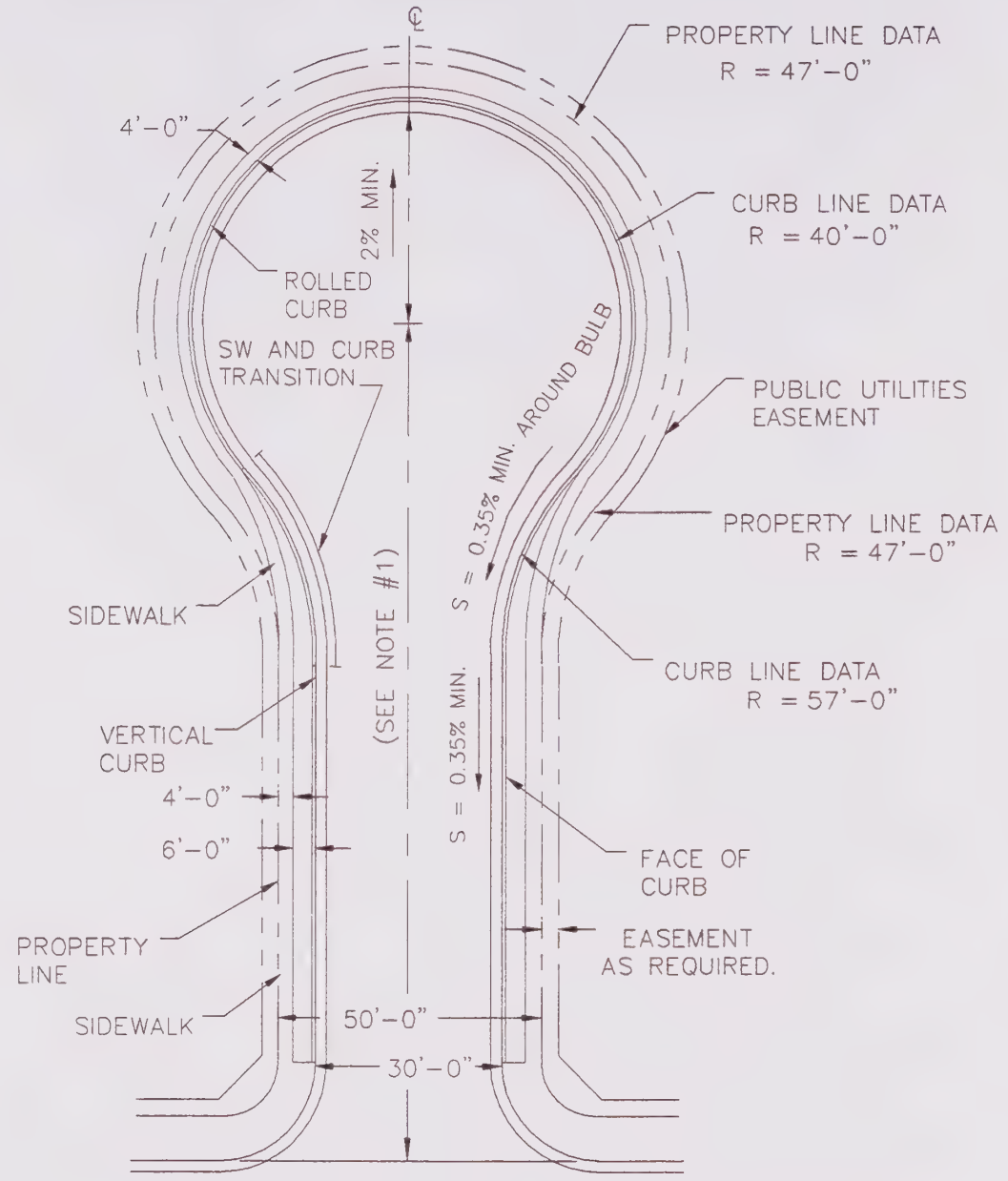
ALIGNMENT FOR 90° STREET INTERSECTION KNUCKLE

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 01/09/02

SUPERCEDES DWG. DATED 2/23/95

DRAWING NO. 19

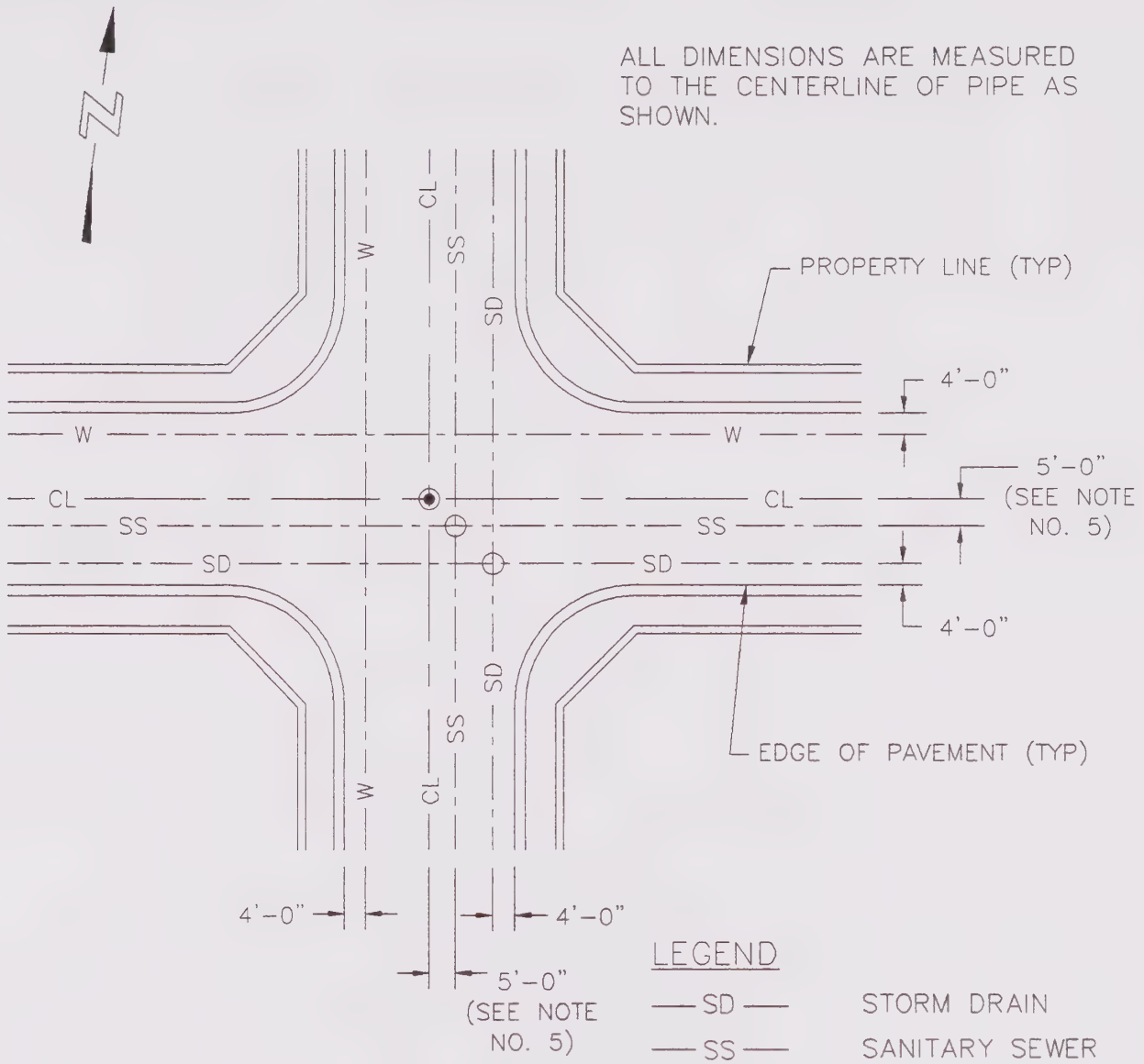


NOTES:

1. THE MAXIMUM LENGTH OF CUL–DE–SACS SHALL BE 500'–0" FROM FACE OF CURB TO THE CENTER OF BULB. ONLY IN INDUSTRIALLY ZONED AREAS MAY THE LENGTH BE INCREASED TO A MAXIMUM OF 1000'–0", PROVIDED THE FOLLOWING CRITERIA ARE MET:
   - A) STREET RIGHT–OF–WAY OF 60'–0" WITH 40'–0" BETWEEN CURBS.
   - B) TURN–AROUND CURB RADIUS OF 53'–0".
   - C) EMERGENCY ACCESS TO ANOTHER PUBLIC STREET MAY BE REQUIRED BY THE FIRE MARSHAL.
2. GUTTER SLOPE AROUND BULBS SHALL BE 0.35% MINIMUM.
3. BULBS MAY BE OFFSET TO EITHER SIDE.
4. A 10'–0" EASEMENT IS REQUIRED FOR PUBLIC UTILITIES AND STREET TREE PLANTING.
5. WATER MAINS MAY BE REQUIRED TO BE "LOOPED" BY THE CITY ENGINEER. SEE WATER SERVICE DRAWINGS FOR APPLICATIONS REQUIRED ON CUL–DE–SACS.

REV. NO.	REV. DATE	REV. BY	MINIMUM STANDARD CUL–DE–SAC	REVISION APPROVED BY CITY ENGINEER
				Finbar J. O'Regan
DIGITIZED 6/1/2003				DATE: 11/25/03
DWG. BY	SCALE		CITY OF STOCKTON	SUPERCEDES DWG. DATED 01/09/02
CK. BY	NONE		DEPARTMENT OF PUBLIC WORKS	DRAWING NO. 20

ALL DIMENSIONS ARE MEASURED TO THE CENTERLINE OF PIPE AS SHOWN.



LEGEND

—SD—	STORM DRAIN
—SS—	SANITARY SEWER
—W—	WATER LINE
—CL—	CENTERLINE

NOTES:

1. SEE DRAWING NO. 5 FOR LOCATION OF ELECTRIC, TELEPHONE, GAS, TV CONDUIT AND STREET LIGHT CONDUIT.
2. SANITARY SEWER AND STORM DRAIN LINES SHALL BE LOWER THAN WATER MAINS. FOR PARALLEL AND PERPENDICULAR CONSTRUCTION, SEE DWG. NO.'S 47, 48 & 49.
3. IN COMMERCIAL OR INDUSTRIAL SUBDIVISIONS WHERE WATER SERVICE SIZES AND LOCATIONS ARE UNKNOWN AT THE TIME THE WATER MAIN IS INSTALLED, THE WATER MAIN MAY BE LOCATED IN THE P.U.E. 2 FEET FROM THE PROPERTY LINE WITH THE APPROVAL OF THE CITY ENGINEER. NO STREET CUTS SHALL BE PERMITTED FOR WATER SERVICES TO THE OPPOSITE SIDE OF THE STREET.
4. 10-FEET MINIMUM SEPARATION BETWEEN WATER LINE AND ANY SANITARY SEWER OR STORM DRAIN LINES AS MEASURED FROM THE OUTSIDE OF THE PIPES.
5. RELOCATE SEWER TO ℄ AS REQUIRED TO MAINTAIN REQUIRED SEPARATION ON LOCAL STREET SECTIONS.

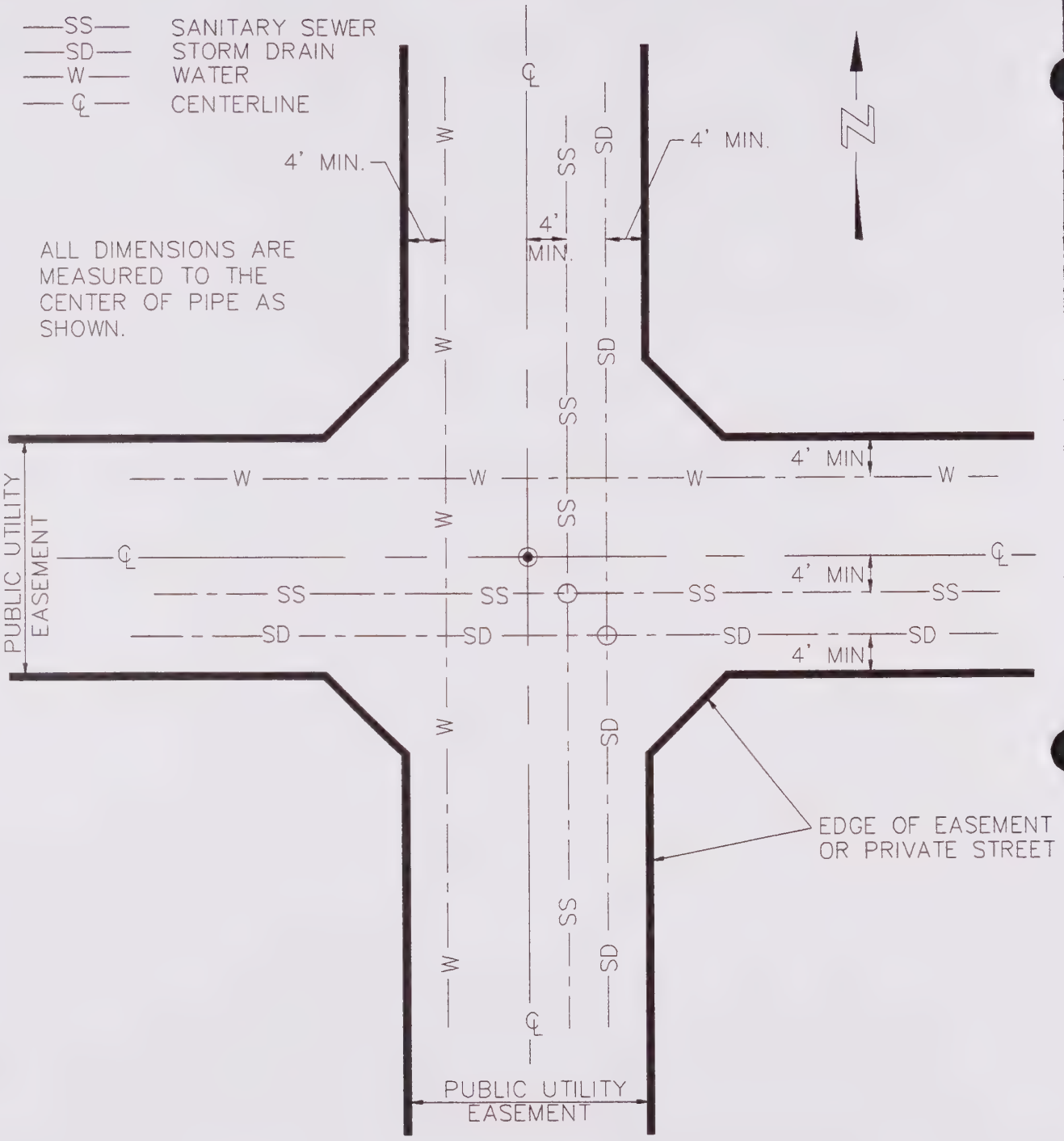
REV. NO.	REV. DATE	REV. BY
4	6/1/2003	HL/EA
DIGITIZED	1/1/92	
DWG. BY	WW	SCALE
CK. BY	RH	NONE

STREET LOCATION OF UNDERGROUND UTILITIES

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 11/25/03

SUPERCEDES DWG. DATED	DRAWING NO.
01/09/02	21



NOTE

1. ALL PRIVATE UTILITIES TO BE LOCATED OUTSIDE OF LIMITS SHOWN UNLESS APPROVED BY THE CITY ENGINEER.
2. 10-FEET MINIMUM SEPARATION BETWEEN WATER LINE AND ANY SEWER LINE AS MEASURED FROM THE OUTSIDE OF THE PIPES.

REV. NO.	REV. DATE	REV. BY
3	6/1/2000	HLE/RH
DIGITIZED	7/1/92	
DWG. BY	WW	SCALE
CK. BY	RH	NONE

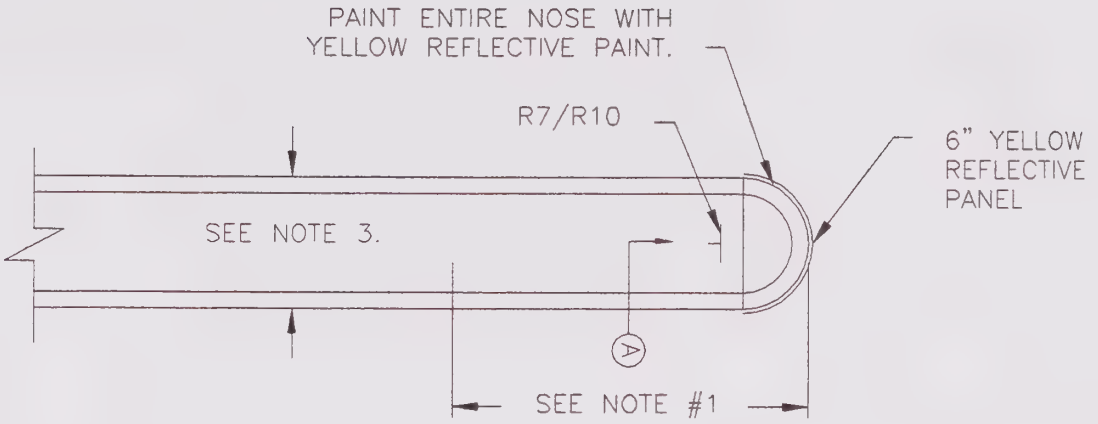
PUBLIC UTILITY LOCATIONS IN PRIVATE STREETS OR EASEMENTS

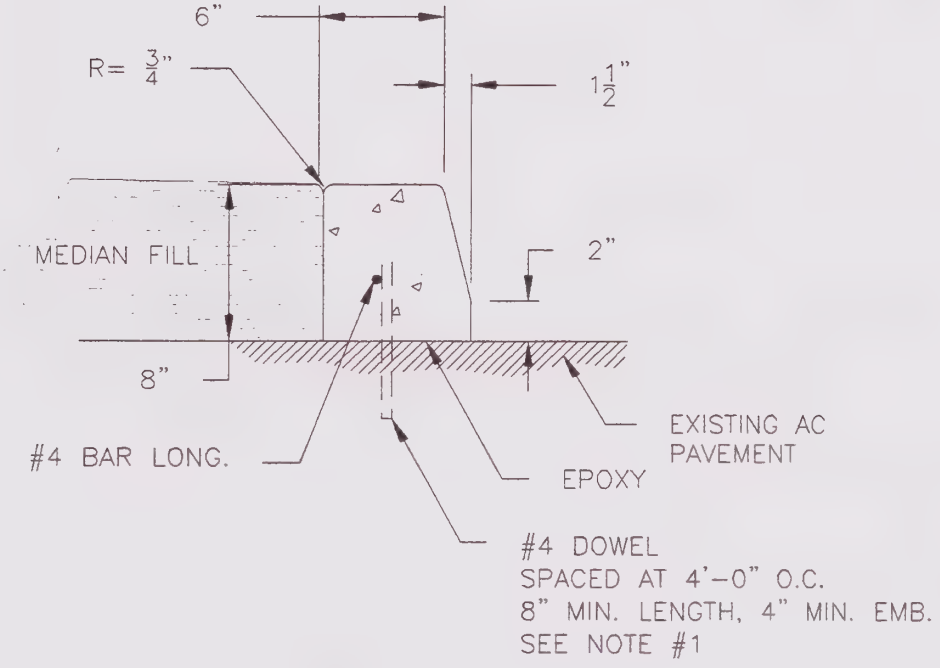
CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 01/09/02

SUPERCEDES DWG. DATED 6/1/94

DRAWING NO. 21A



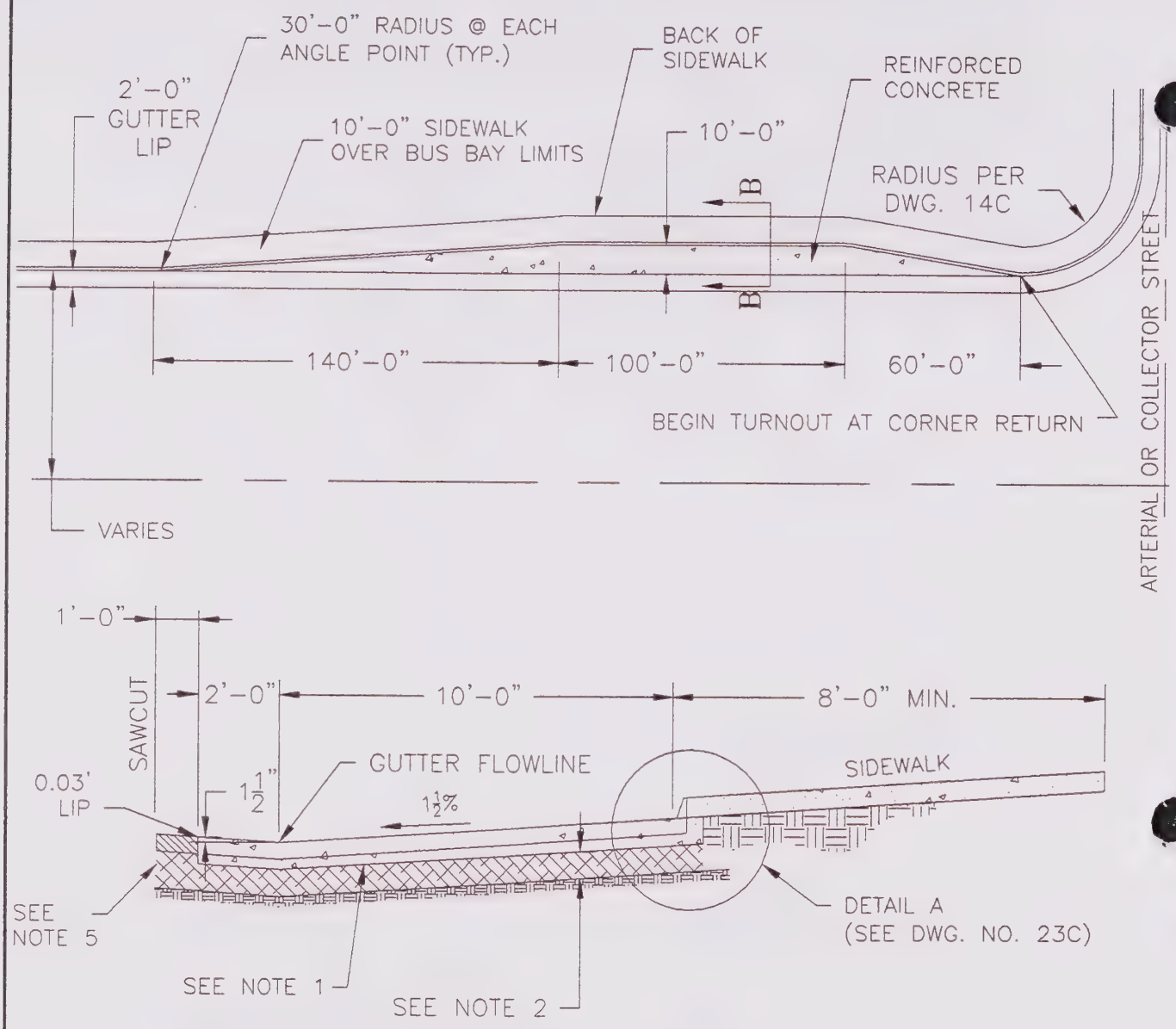


Ⓐ MEDIAN CURB – TYPE 4
N.T.S

NOTES:

1. PLACE STEEL DOWELS WITHIN THE FIRST 20'–0" OF MEDIAN FROM ANY END.
2. FOR APPLICATION INSTRUCTIONS, FOLLOW CALTRANS STANDARD SECTION 73–1.05B.
3. MINIMUM MEDIAN 2'–0" WIDTH, UNLESS APPROVED BY THE CITY ENGINEER.

REV. NO.	REV. DATE	REV. BY	MEDIAN CURBING OVER EXISTING PAVEMENT	REVISION APPROVED BY CITY ENGINEER Finbar J. O'Regan DATE: 11/25/03	
DIGITIZED 6/1/2003					
DWG. BY CG	SCALE		CITY OF STOCKTON DEPARTMENT OF PUBLIC WORKS	SUPERCEDES DWG. DATED	DRAWING NO. 22
CK. BY	NONE				



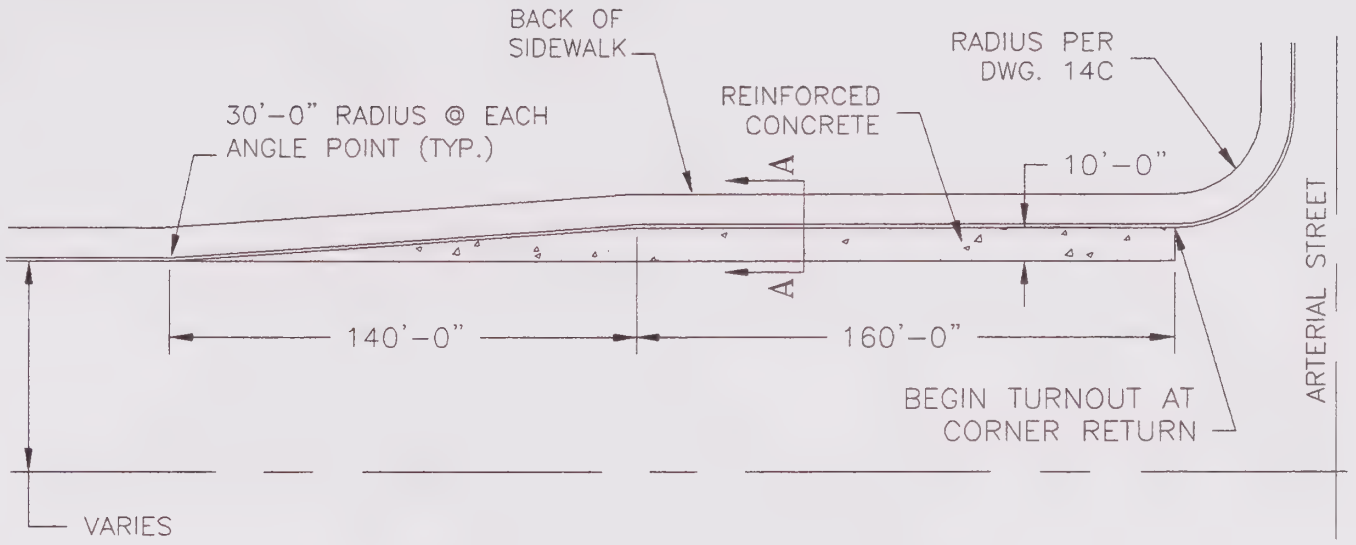
SECTION B-B *

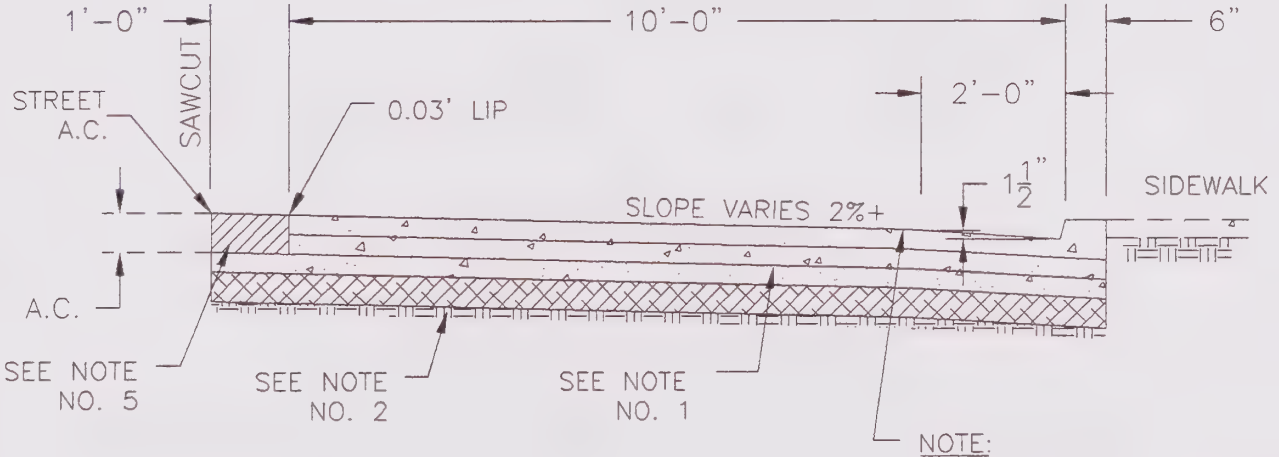
* BUS TURNOUT CROSS SECTION SHOWN FOR COLLECTOR STREETS CAN ALSO BE USED FOR ARTERIAL STREETS.
* SEE DWG. 23C FOR NOTES.

CRITERIA FOR INSTALLATION:

BUS TURNOUTS SHALL BE INSTALLED ON ALL FOUR DEPARTURE LEGS WHEN AN ARTERIAL STREET INTERSECTS WITH AN ARTERIAL STREET OR COLLECTOR STREET. BUS TURNOUTS AT THE INTERSECTION OF AN ARTERIAL STREET AND LOCAL STREET SHALL BE INSTALLED ON A CASE-BY-CASE BASIS WITH SJRTD RECOMMENDATION.

REV. NO.	REV. DATE	REV. BY	BUS TURNOUTS ARTERIAL STREETS	REVISION APPROVED BY CITY ENGINEER Finbar J. O'Regan DATE: 11/25/03
DIGITIZED	6/1/2003			
DWG. BY	HLE	SCALE	CITY OF STOCKTON DEPARTMENT OF PUBLIC WORKS	SUPERCEDES DWG. DATED
CK. BY	TG	NONE		DRAWING NO. 23A





SECTION A-A

SEE DWG. 23C FOR NOTES.

CRITERIA FOR INSTALLATION:

BUS TURNOUTS SHALL BE INSTALLED ON ALL FOUR DEPARTURE LEGS WHEN A COLLECTOR STREET INTERSECTS WITH AN ARTERIAL STREET. BUS TURNOUTS AT THE INTERSECTION OF TWO COLLECTOR STREETS SHALL BE INSTALLED ON A CASE-BY-CASE BASIS WITH SJRTD RECOMMENDATION.

REV. NO.	REV. DATE	REV. BY

DIGITIZED 6/1/2003

DWG. BY HLE SCALE

CK. BY TG NONE

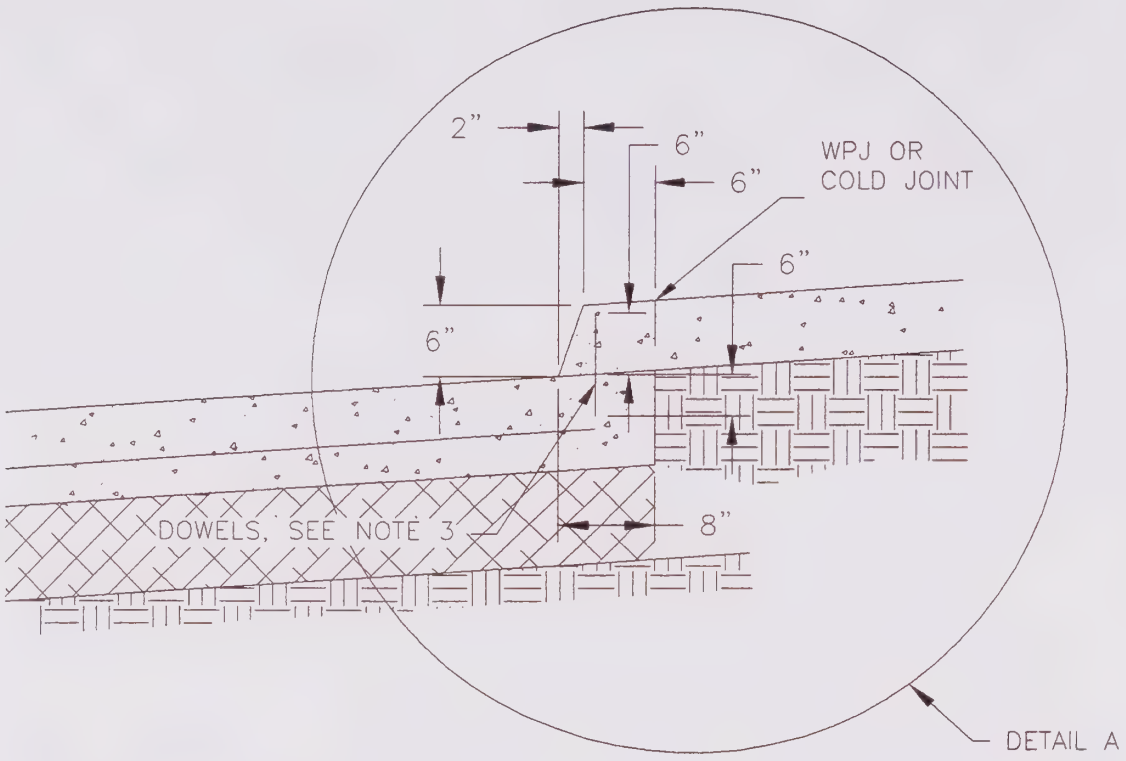
BUS TURNOUTS COLLECTOR STREETS

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 11/25/03

SUPERCEDES DWG. DATED

DRAWING NO. 23B



DETAIL A

NOTES:

1) CONCRETE SHALL BE NINE INCHES THICK WITH #4, GRADE 60 REBAR AT 2'–0" CENTER EACH WAY. USE THREE INCH DOBIES (REBAR SPACERS WITH WIRE TIES). CONCRETE SHALL BE CLASS A, SIX SACK, ALL FINISH SHALL BE MEDIUM BROOM.

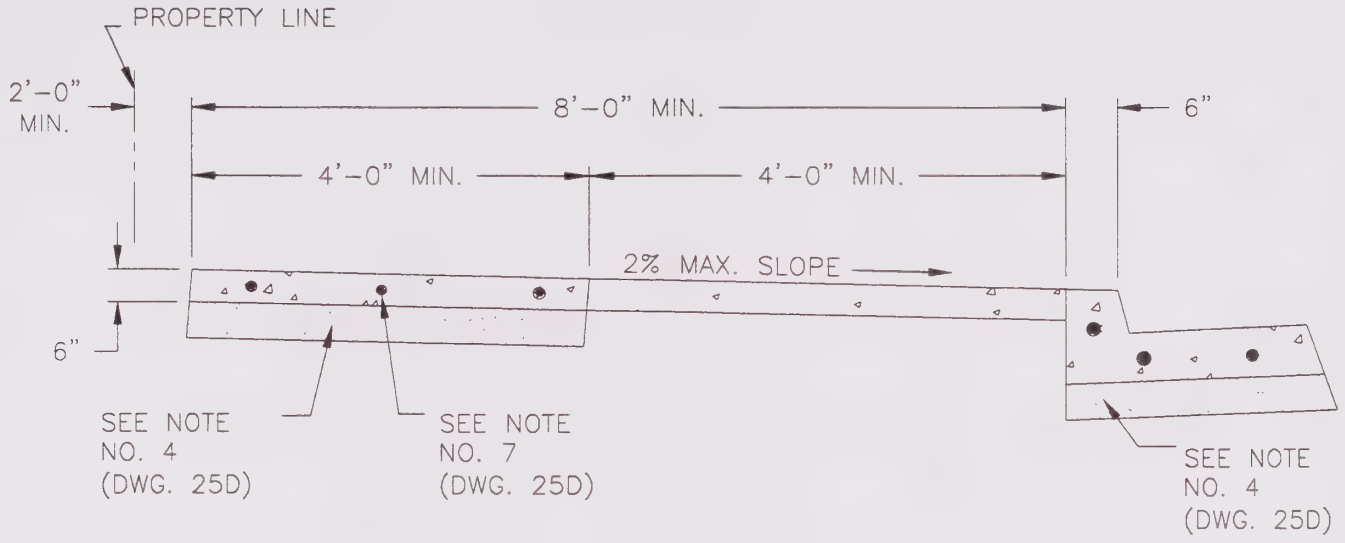
2) PLACE SIX INCHES OF $\frac{3}{4}$" AGGREGATE BASE AT 95% RELATIVE COMPACTION.

3) THE SLAB FOR THE BUS TURNOUT MAY BE PLACED MONOLITHICALLY WITH THE CURB AND SIDEWALK (PREFERRED). IF CONCRETE IS PLACED WITH A COLD JOINT BETWEEN THE BOTTOM OF THE CURB AND THE TURNOUT SLAB, THEN THE CURB SHALL BE DOWELED (WET SET) TO THE SLAB WITH #4, GRADE 60 REBAR AT FOUR FOOT CENTERS. CURB SHALL ALSO BE EPOXYED TO THE SLAB

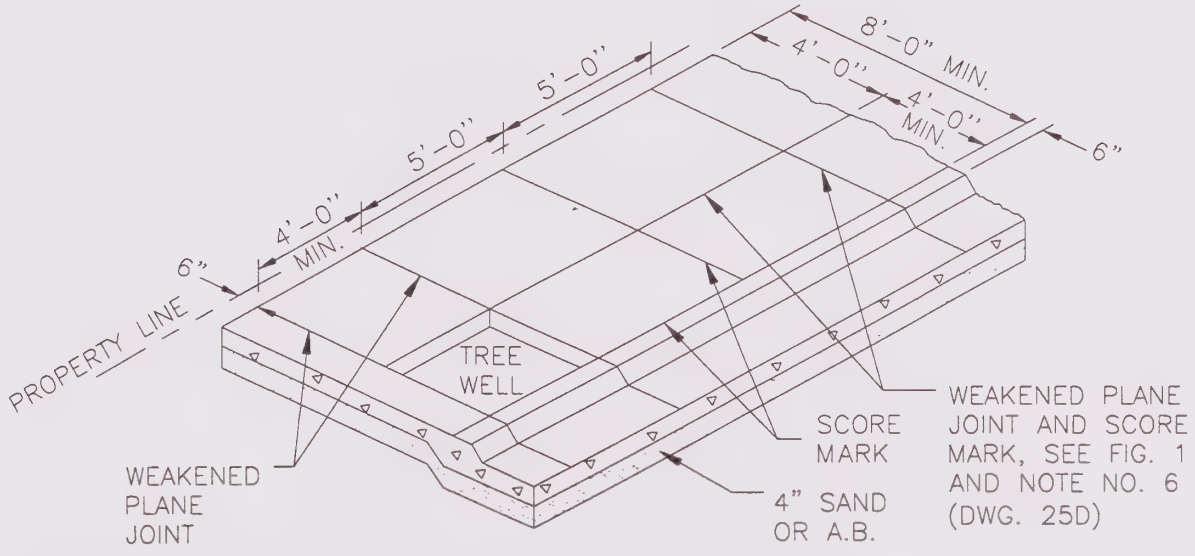
4) PLACE 2 INCH DEEP TOOL JOINTS AT 10 FOOT CENTERS, PERPENDICULAR TO THE LIP OF GUTTER IN THE TURNOUT SLAB AND EXTENDED PERPENDICULAR TO THE FACE OF CURB IN THE CURB AND SIDEWALK.

5) EXISTING STRUCTURAL SECTION OR PER PLANS WHICHEVER IS GREATER.

REV. NO.	REV. DATE	REV. BY	BUS TURNOUTS	REVISION APPROVED BY CITY ENGINEER
				Finbar J. O'Regan
DIGITIZED	6/1/2003			DATE: 11/25/03
DWG. BY HLE	SCALE		CITY OF STOCKTON	SUPERCEDES DWG. DATED
CK. BY TG	NONE		DEPARTMENT OF PUBLIC WORKS	DRAWING NO. 23C



SECTION AT TREEWELL



VERTICAL CURB, GUTTER & SIDEWALK WITH TREE WELLS

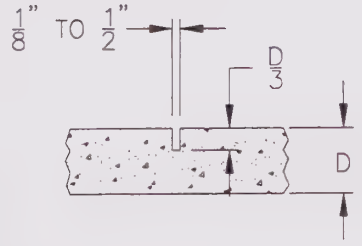


FIG. 1 WEAKENED PLANE JOINT

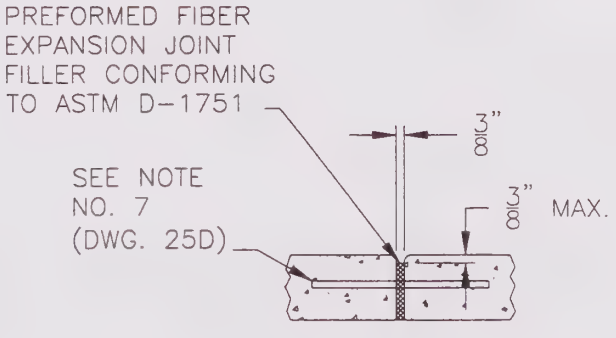


FIG. 2 EXPANSION JOINT

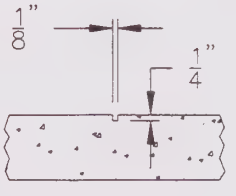


FIG. 3 SCORE LINE

REV. NO.	REV. DATE	REV. BY
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DIGITIZED	7/1/90	
DWG. BY	RC	SCALE
CK. BY		NONE

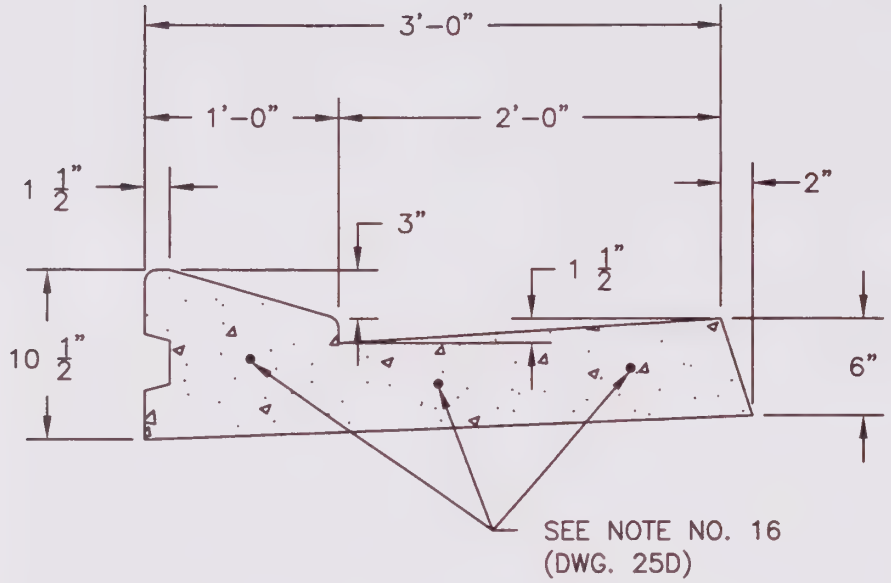
SIDEWALK DETAILS

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

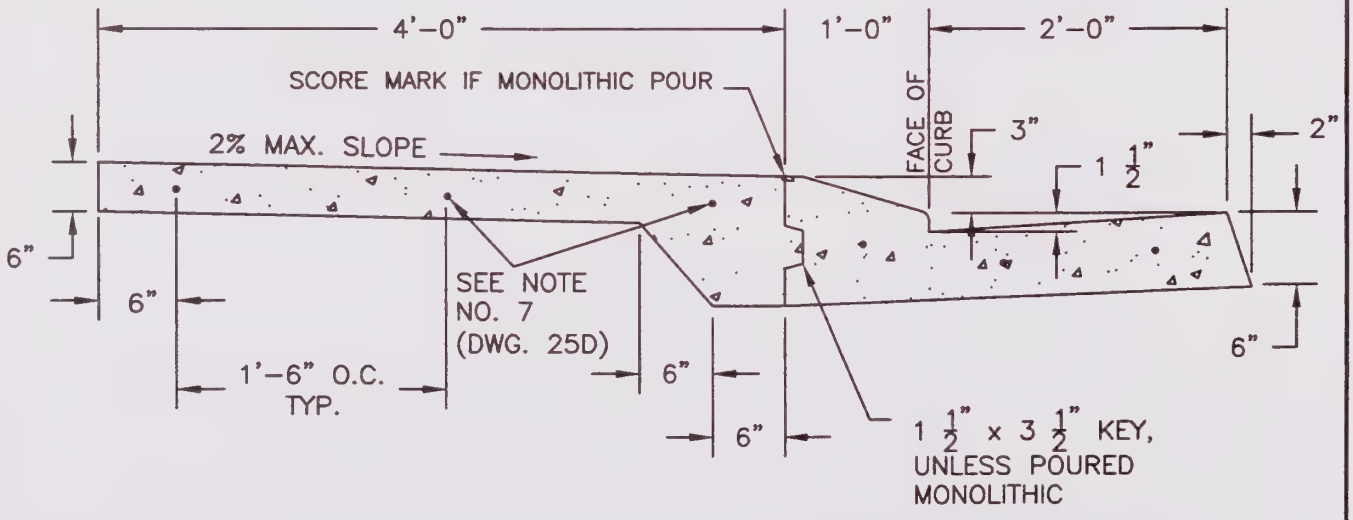
REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 11/25/03

SUPERCEDES DWG. DATED 01/09/02

DRAWING NO. 25

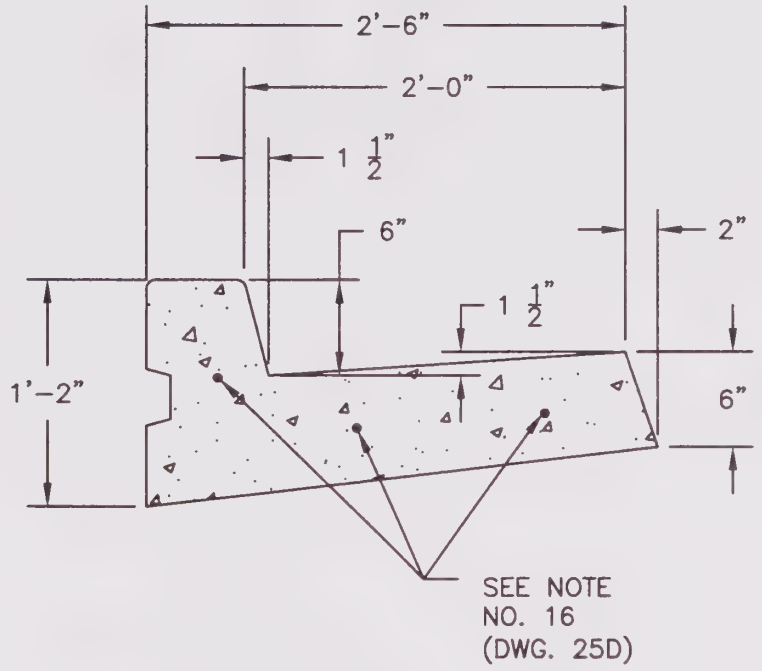


ROLL TYPE CURB & GUTTER

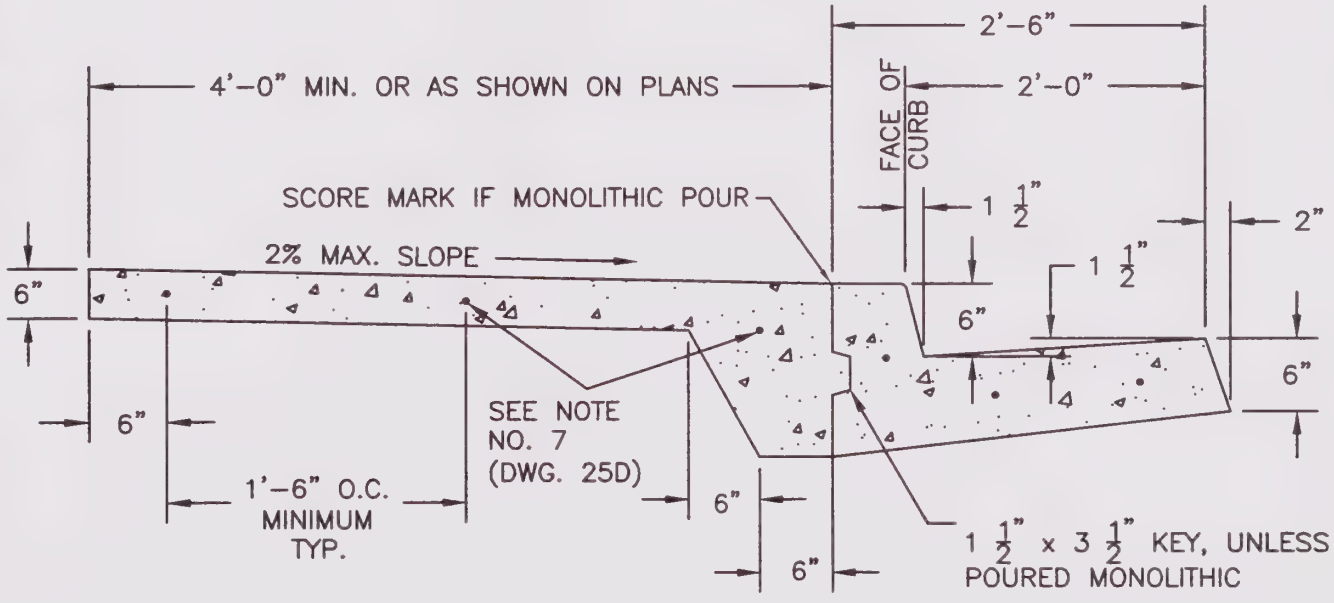


ROLL TYPE CURB, GUTTER & SIDEWALK

REV. NO.	REV. DATE	REV. BY	ROLL CURB, GUTTER & SIDEWALK	REVISION APPROVED BY CITY ENGINEER
1	6/1/2003	HL/EA		Finbar J. O'Regan
DIGITIZED				DATE: 11/25/03
DWG. BY	SCALE		CITY OF STOCKTON	SUPERCEDES DWG. DATED
CK. BY	NONE		DEPARTMENT OF PUBLIC WORKS	DRAWING NO. 25A



VERTICAL CURB & GUTTER



VERTICAL CURB, GUTTER & SIDEWALK

REV. NO.	REV. DATE	REV. BY
1	6/1/2003	HL/EA
DIGITIZED		

VERTICAL CURB, GUTTER & SIDEWALK

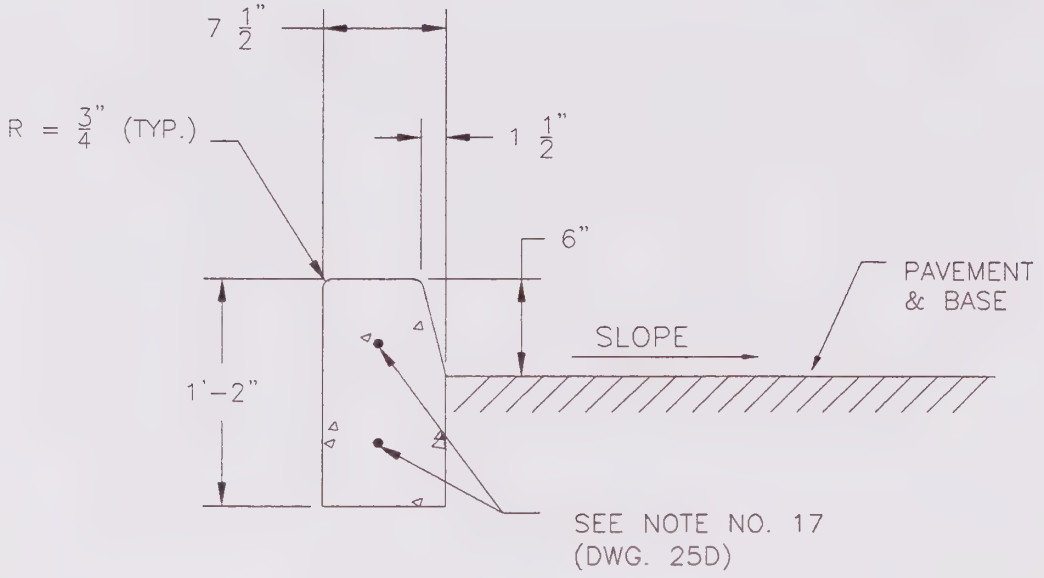
REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 11/25/03

DWG. BY	SCALE
CK. BY	NONE

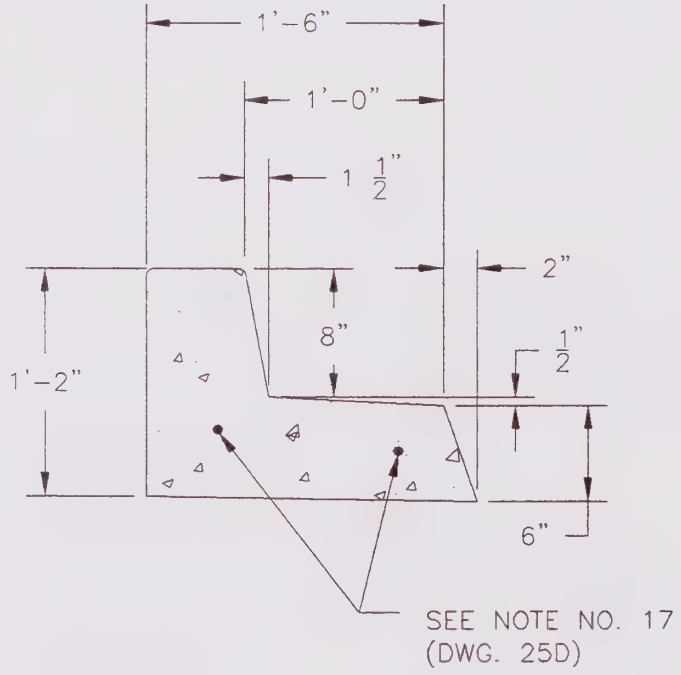
CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

SUPERCEDES DWG. DATED

DRAWING NO. 25B



TYPE "B" VERTICAL CURB



TYPE "F" CURB & APRON

REV. NO.	REV. DATE	REV. BY	VERTICAL CURB CURB & APRON	REVISION APPROVED BY CITY ENGINEER Finbar J. O'Regan DATE: 11/25/03
1	6/1/2003	HL/EA		
DIGITIZED				
DWG. BY	SCALE		CITY OF STOCKTON DEPARTMENT OF PUBLIC WORKS	SUPERCEDES DWG. DATED
CK. BY	NONE			DRAWING NO. 25C

NOTES:

1. CURB, GUTTER, AND ALL P.C.C. FLATWORK TO HAVE A LIGHT BROOM FINISH.
2. CONSTRUCT EXPANSION JOINTS 150'–0" ON CENTER MAXIMUM, AND AT RETURNS, LIGHT POLES, HYDRANTS, CATCH BASINS, BOTH SIDES OF DRIVEWAY, AND OTHER FIXED OBJECTS.
3. CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE APPLICABLE SECTIONS OF THE CURRENT CITY OF STOCKTON STANDARD SPECIFICATIONS.
4. 4" SAND OR AGGREGATE BASE. ALL MATERIAL UNDER SAND BASE SHALL BE SCARIFIED FOR A 6" MINIMUM DEPTH AND COMPACTED TO 90% RELATIVE COMPACTION.
5. SEE DEFINITION SECTION OF STANDARD SPECIFICATIONS FOR DEFINITION OF SAND.
6. WEAKENED PLANE JOINTS AND SCORE MARKS AS SHOWN. SEE FIGURE 1 FOR WEAKENED PLANE JOINT WIDTH AND DEPTH.
7. PLACE 5/8" x 24" LONG STEEL DOWELS THROUGH EVERY EXPANSION JOINT SPACED AT 1'–6" ON CENTER (MIN.), GREASED AND WRAPPED ON ONE SIDE, OFFSET 6" FROM CONCRETE EDGES, UNLESS OTHERWISE SHOWN OR SPECIFIED. MINIMUM THREE DOWELS IN 4' WIDE SIDEWALK.
8. CURB, GUTTER AND SIDEWALK CONSTRUCTION SHALL CONFORM TO SECTION 73, STANDARD SPECIFICATIONS, CALIFORNIA DEPARTMENT OF TRANSPORTATION (CALTRANS), EXCEPT AS MODIFIED HEREIN.
9. SUBGRADE FOR CURB, GUTTER, SIDEWALK AND DRIVEWAYS SHALL BE COMPACTED TO A MINIMUM RELATIVE COMPACTION OF 90% TO A DEPTH OF 6". WHERE THE SUBGRADE "R" VALUE IS LESS THAN 50, PLACE 4" MINIMUM OF AGGREGATE SUBBASE CLASS IV UNDER THE CONCRETE SECTIONS AND COMPACT TO A MINIMUM OF 90%.
10. ALL RADII FOR ROUNDING EDGES SHALL BE 3/4" UNLESS NOTED.
11. CONCRETE SHALL BE CLASS B, PER CALTRANS SECTION 90.
12. EXPANSION JOINTS AND WEAKENED PLANE JOINTS SHALL BE INSTALLED AS INDICATED ON THE PLANS OR STANDARD DETAILS.
13. CURB, GUTTER AND SIDEWALK SHALL HAVE A FINE HAIR BROOM FINISH; CURB AND GUTTER PARALLEL TO THE FLOW LINE.
14. DEPRESS A 2" HIGH LETTER "W" OR "S" 1/4" DEEP INTO THE TOP OF THE CURB TO IDENTIFY SERVICE LOCATIONS.
15. DURING CONSTRUCTION OF GUTTERS, WATER SHALL BE USED TO INSURE PROPER DRAINAGE ALONG THE FLOWLINE.
16. 3–5/8" x 24" LONG STEEL DOWELS MINIMUM THROUGH EVERY EXPANSION JOINT.
17. 2–5/8" x 24" LONG STEEL DOWELS MINIMUM THROUGH EVERY EXPANSION JOINT.

REV. NO.	REV. DATE	REV. BY

DIGITIZED 6/ /2003

DWG. BY HL | SCALE NONE

CK. BY

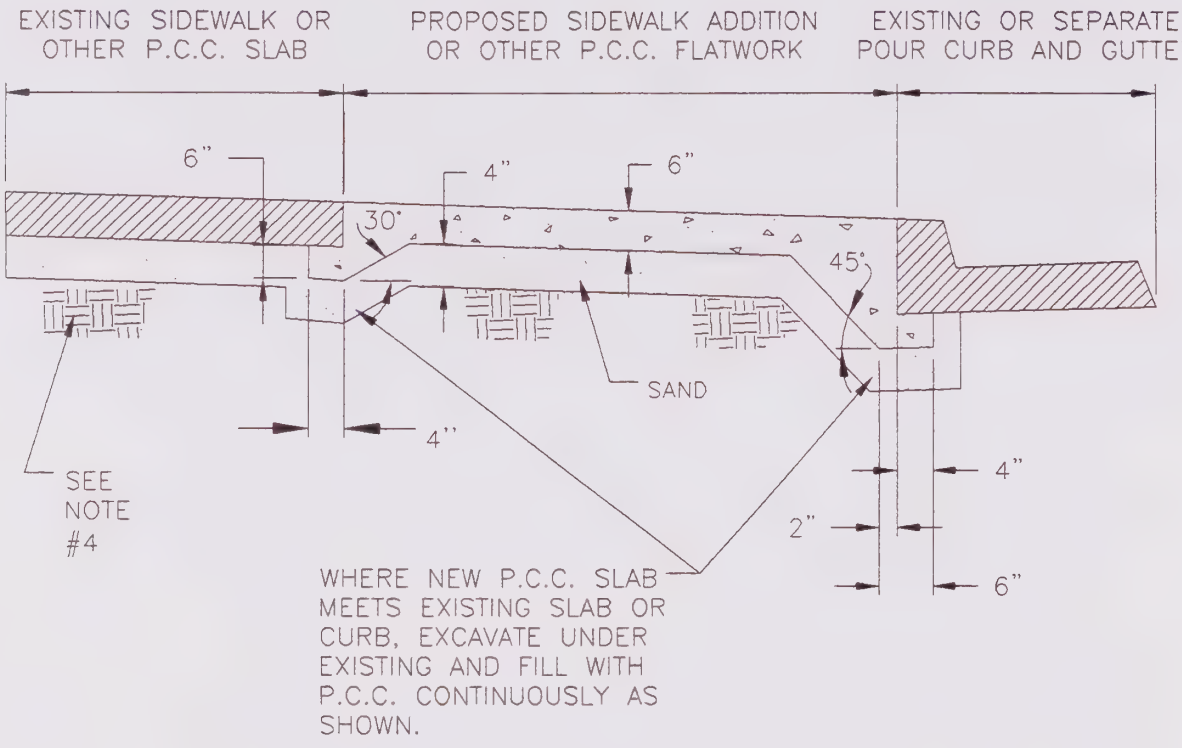
CONCRETE CURB, GUTTER AND SIDEWALK CONSTRUCTION STANDARDS

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 11/25/03

SUPERCEDES DWG. DATED

DRAWING NO. 25D



NOTES:

1. IF THE NEW P.C.C. SLAB IS POURED MONOLITHICALLY WITH THE CURB AND GUTTER, OR IF THE CURB, GUTTER, AND SLAB ARE KEYED IN ACCORDANCE WITH THE COUNTYWIDE STANDARD (CW-C7), THE ABOVE KEY WILL NOT BE REQUIRED.
2. THE ABOVE KEY SHALL BE REQUIRED BETWEEN EXISTING AND PROPOSED P.C.C. AT ALL DRIVEWAYS.
3. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE APPLICABLE SECTIONS OF THE CURRENT CITY OF STOCKTON STANDARD SPECIFICATIONS.
4. MATERIAL UNDER ALL SAND BASE SHALL BE COMPACTED TO 90% RELATIVE COMPACTION FOR A MINIMUM DEPTH OF 6".
5. CURB, GUTTER, AND ALL P.C.C FLATWORK TO HAVE A FINE HAIR BROOM FINISH.

REV. NO.	REV. DATE	REV. BY
5	6/1/2003	HL/EA
DIGITIZED	7/1/91	
DWG. BY	RC	SCALE
CK. BY		NONE

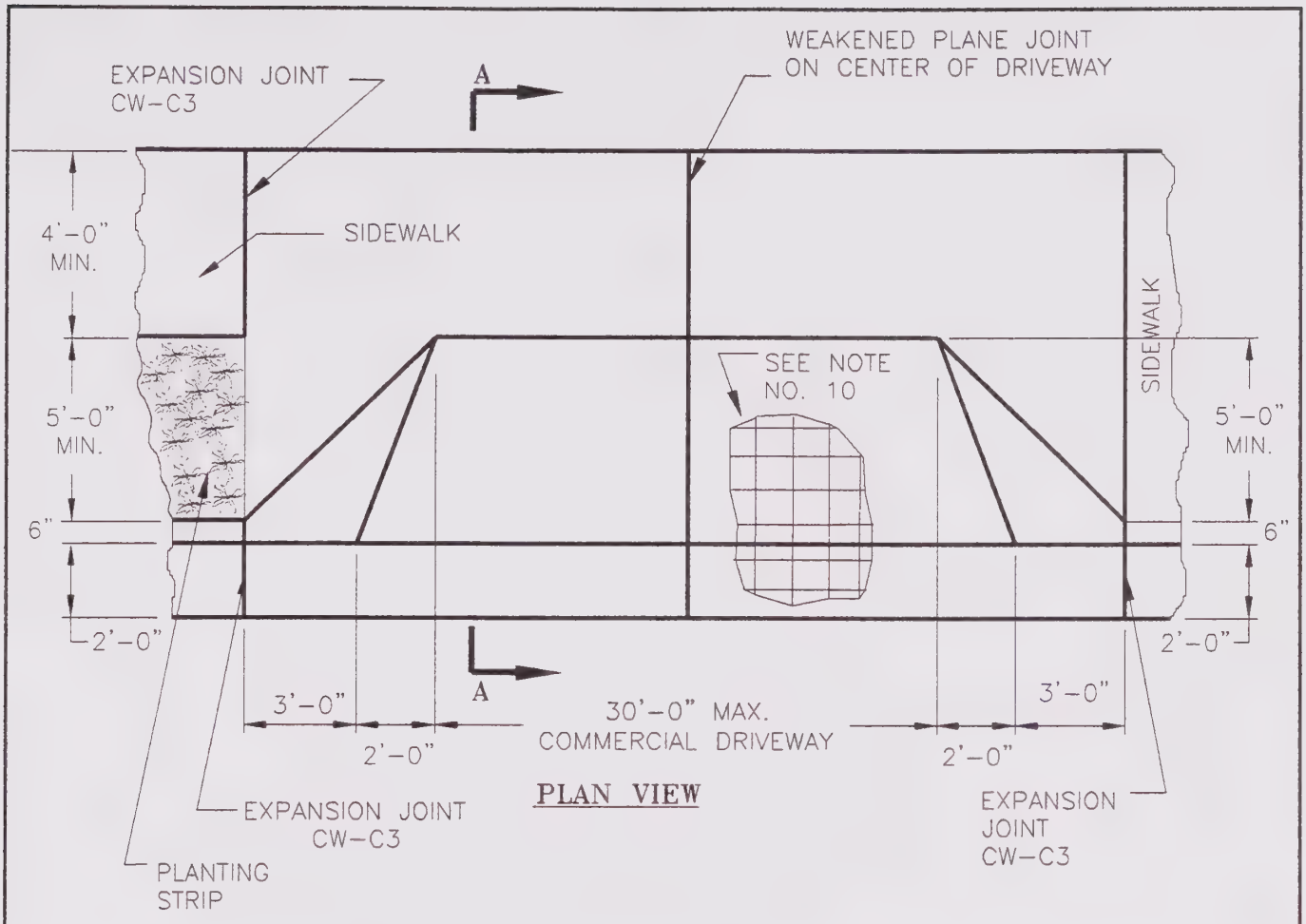
KEYING CONCRETE SLABS

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbarr J. O'Regan
DATE: 11/25/03

SUPERCEDES DWG. DATED 1/9/02

DRAWING NO. 26



NOTES:

1. THIS DRIVEWAY TO BE USED ONLY WHERE APPROVED BY THE CITY ENGINEER.
2. DRIVEWAY TO CONFORM WITH EXISTING SIDEWALK. ALL CONCRETE TO BE CLASS B (5 SACK).
3. IF SIDEWALK IN BACK EXISTS, WHERE NEW RAMP TO BE PLACED, IT SHALL BE REMOVED AND REPLACED WITH 6" THICK PORTLAND CEMENT CONCRETE.
4. WHERE HIGH STREET CROWN EXISTS, DRIVEWAY RAMP MAY BE EXTENDED FROM BACK OF WALK TO LIP.
5. WHERE DRIVEWAY PROVIDES ACCESS TO A ONE-WAY STREET, APPROPRIATE SIGNS AS SPECIFIED BY THE CITY TRAFFIC ENGINEER WILL BE REQUIRED.
6. DRIVEWAY RAMP SHALL BE AS WIDE AS EXISTING DRIVEWAY INTO YARD, ROUNDED UP TO NEXT EVEN FOOT (10'-0" MINIMUM).
7. IN EVENT OF OBSTRUCTIONS IN PARKWAY (E.G., POWER POLES, ETC.) WIDTH MAY BE MODIFIED TO MEET EXISTING CONDITIONS AS APPROVED BY THE CITY ENGINEER.
8. PARKWAY WARP WINGS SHALL BE 3'-0" FOR 6" CURB OR HIGHER.
9. WHEN IT IS NOT POSSIBLE TO PROVIDE 2'-0" OF FULL HEIGHT WITH STANDARD 3'-0" WARPS ON EITHER SIDE BETWEEN ADJACENT DRIVEWAYS, A COMMON DRIVEWAY SHALL BE INSTALLED.
10. #4 BAR AT 18" ON CENTER, EACH WAY.
11. FINE HAIR BROOM FINISH.

REV. NO.	REV. DATE	REV. BY
5	6/1/2000	HLE/RH
DIGITIZED	7/1/91	
DWG. BY RC	SCALE	
CK. BY	NONE	

COMMERCIAL RAMP DRIVEWAY

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 01/09/02

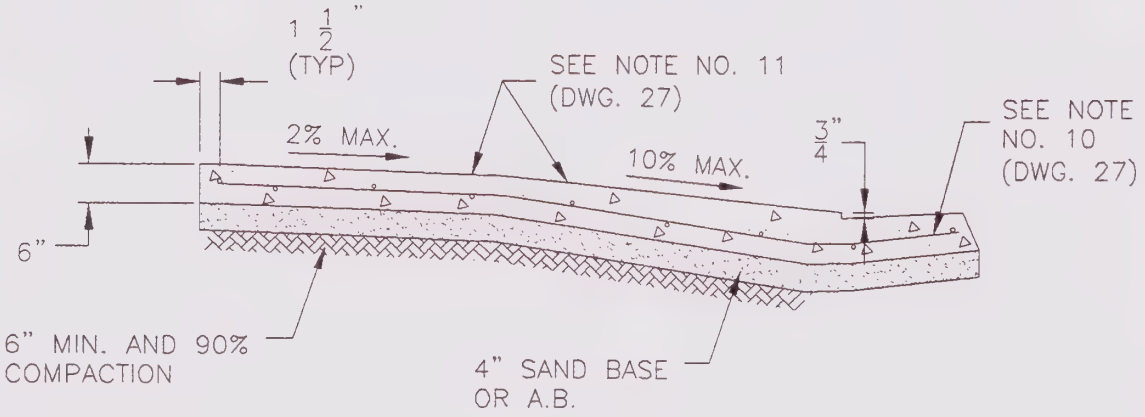
SUPERCEDES DWG. DATED 2/23/95

DRAWING NO. 27

(CONT'D FROM DWG. 27)



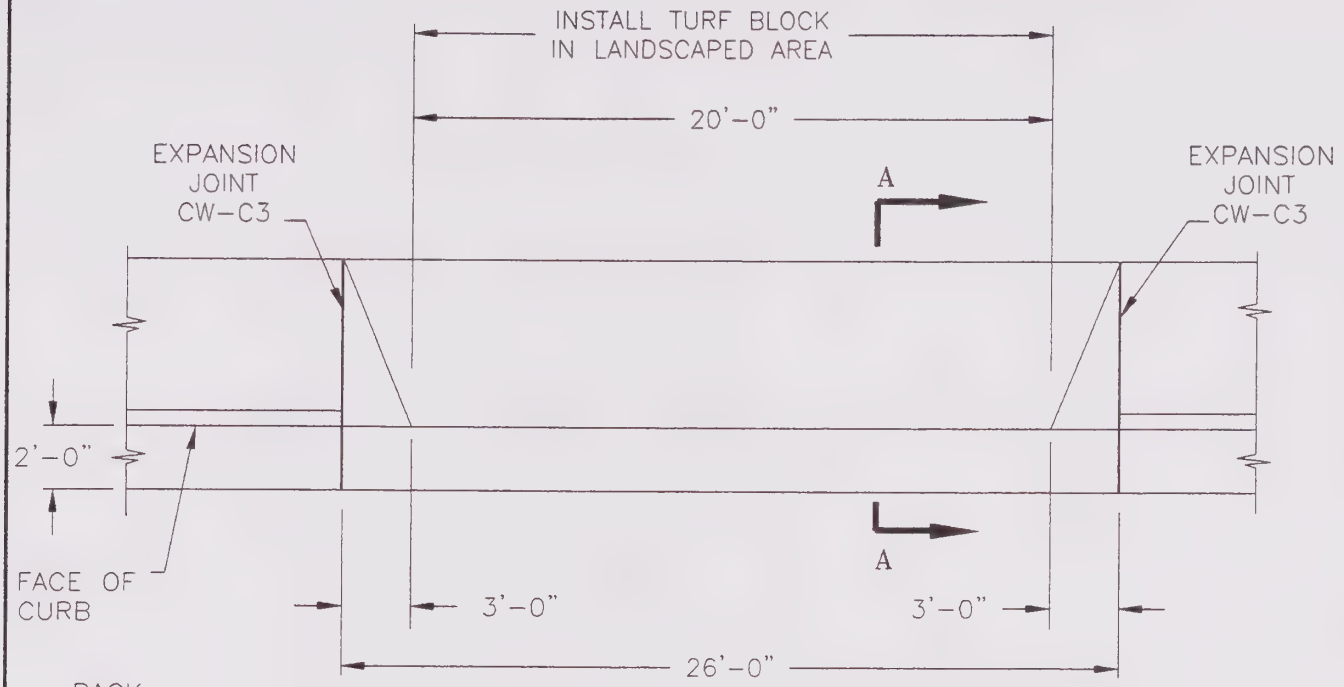
FRONT ELEVATION



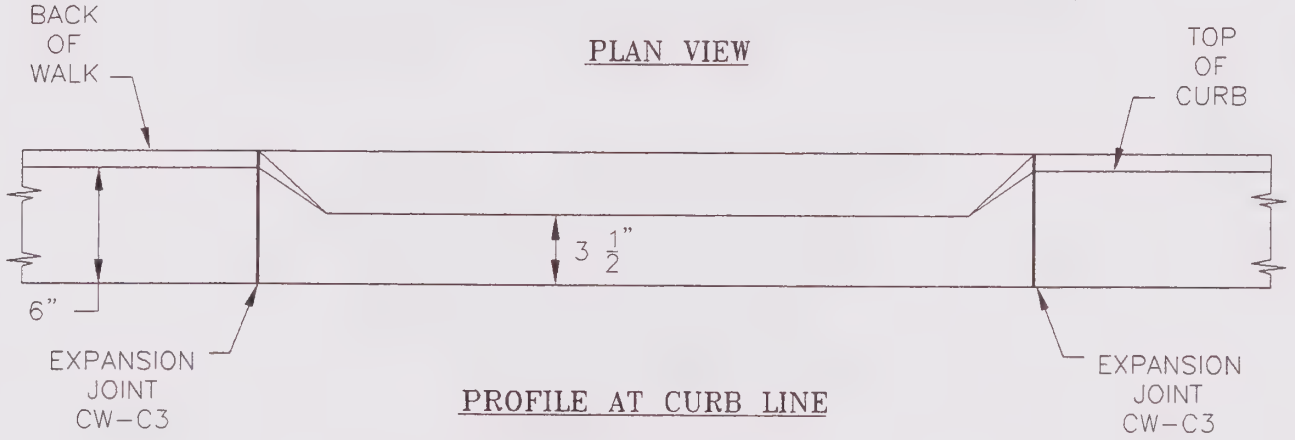
SECTION A – A

REV. NO.	REV. DATE	REV. BY	COMMERCIAL RAMP DRIVEWAY	REVISION APPROVED BY CITY ENGINEER
5	6/1/2000	HLE/RH		Finbar J. O'Regan
DIGITIZED	7/1/91			DATE: 01/09/02
DWG. BY RC	SCALE		CITY OF STOCKTON	SUPERCEDES DWG. DATED
CK. BY	NONE		DEPARTMENT OF PUBLIC WORKS	2/23/95

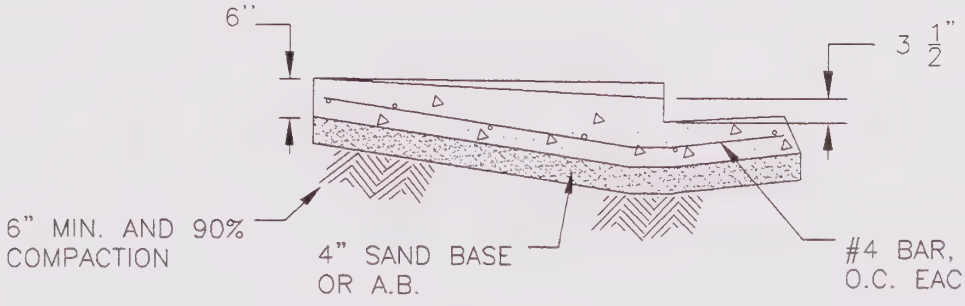
DRAWING NO. 27A



PLAN VIEW



PROFILE AT CURB LINE



SECTION A – A

NOTES:

1. SEE C.O.S. STANDARD DRAWING NO. 38 FOR DETAILS NOT SHOWN.
2. INSTALL TURF BLOCK IN LANDSCAPED AREA AS REQUIRED BY CITY ENGINEER.
3. INSTALL PIPE GATE (COS STD DWG NO 27C & 27D) AS REQUIRED BY CITY ENGINEER.

REV. NO.	REV. DATE	REV. BY
5	6/1/2003	HL/EA
DIGITIZED	1/1/92	
DWG. BY	RC	SCALE
CK. BY		NONE

FIRE ACCESS DRIVEWAY

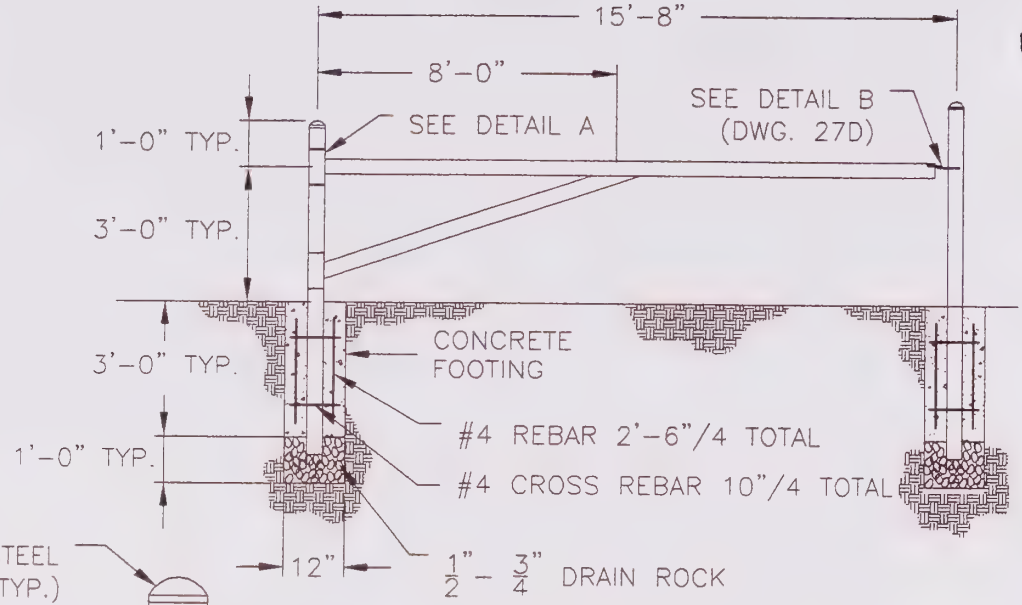
CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 11/25/03

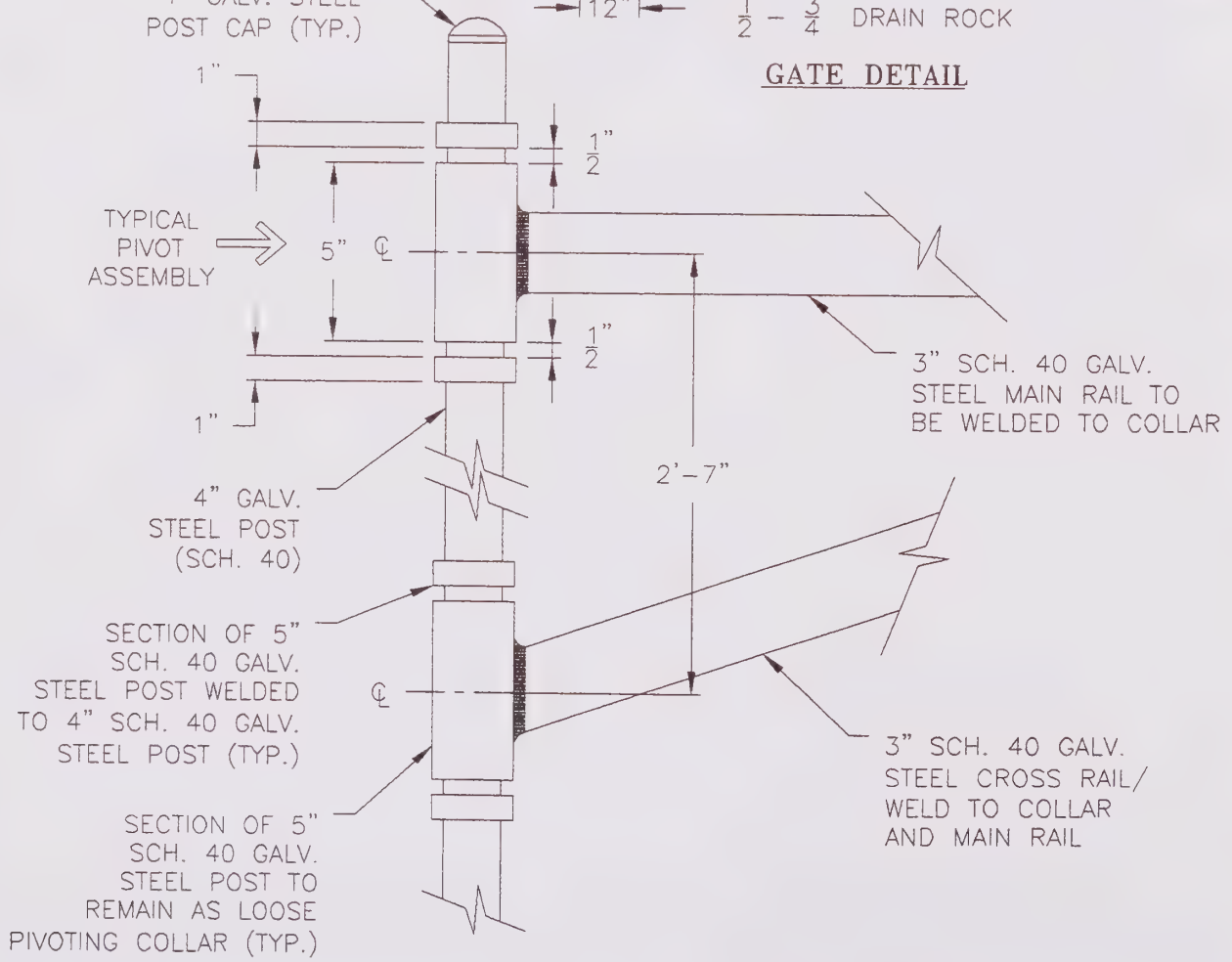
SUPERCEDES DWG. DATED 01/09/02

DRAWING NO. 27B

(CONT'D FROM DWG. 27B)



GATE DETAIL



DETAIL A (GATE TO POST DETAIL PIVOT)

REV. NO.	REV. DATE	REV. BY
	6/1/2000	HLE/RH
DIGITIZED		
DWG. BY HLE	SCALE	
CK. BY	NONE	

FIRE ACCESS PIPE GATE

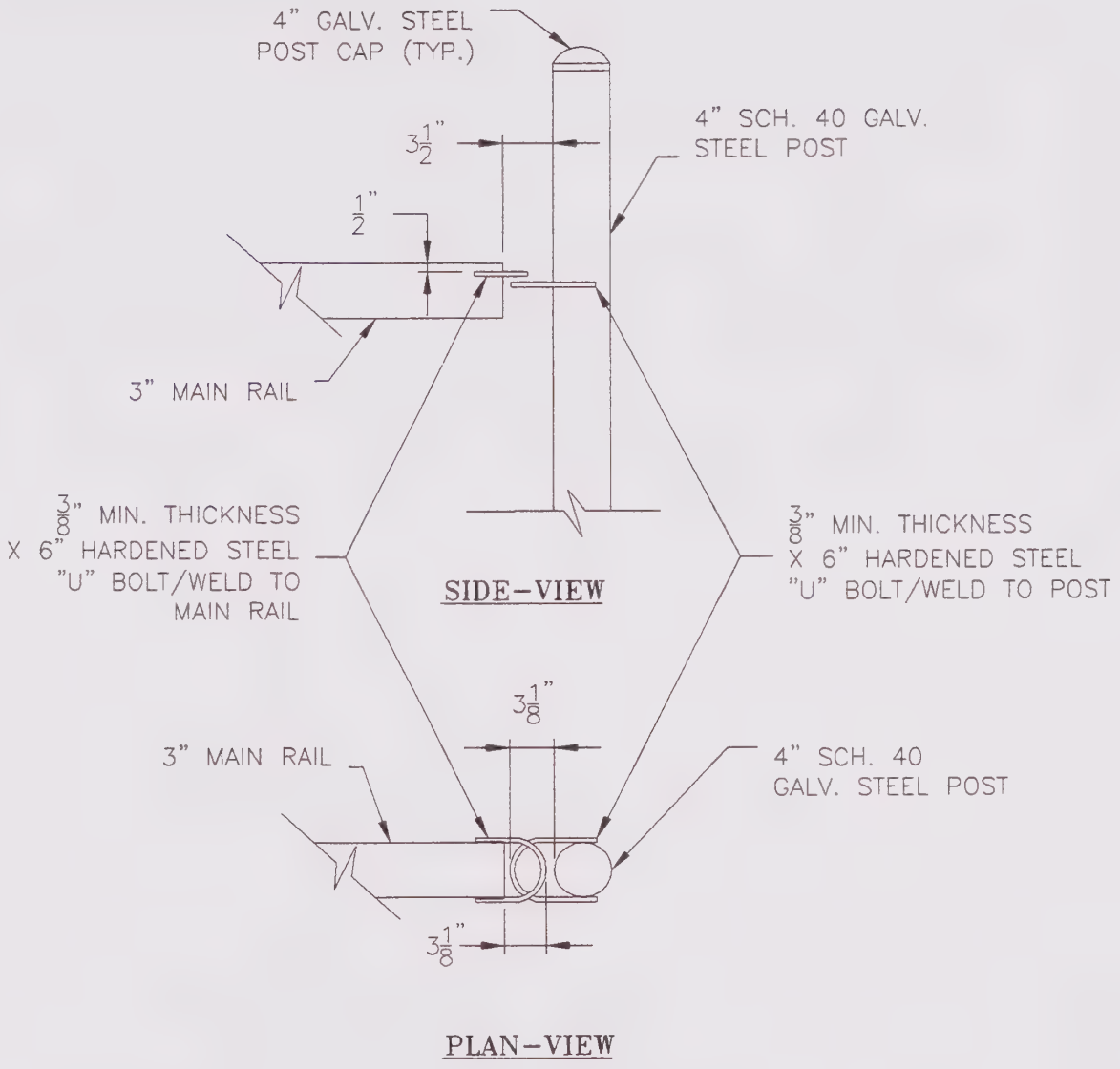
CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

NEW DRAWING APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 01/09/02

SUPERCEDES DWG. DATED

DRAWING NO. 27C

(CONT'D FROM DWG. 27C)



DETAIL B (RAIL TO POST LOCK DETAIL)

NOTE: LOCKING MECHANISM SHALL BE SUBJECT TO THE APPROVAL OF THE FIRE DEPARTMENT.

REV. NO.	REV. DATE	REV. BY
	6/1/2000	HLE/RH
DIGITIZED		
DWG. BY HLE	SCALE	
CK. BY	NONE	

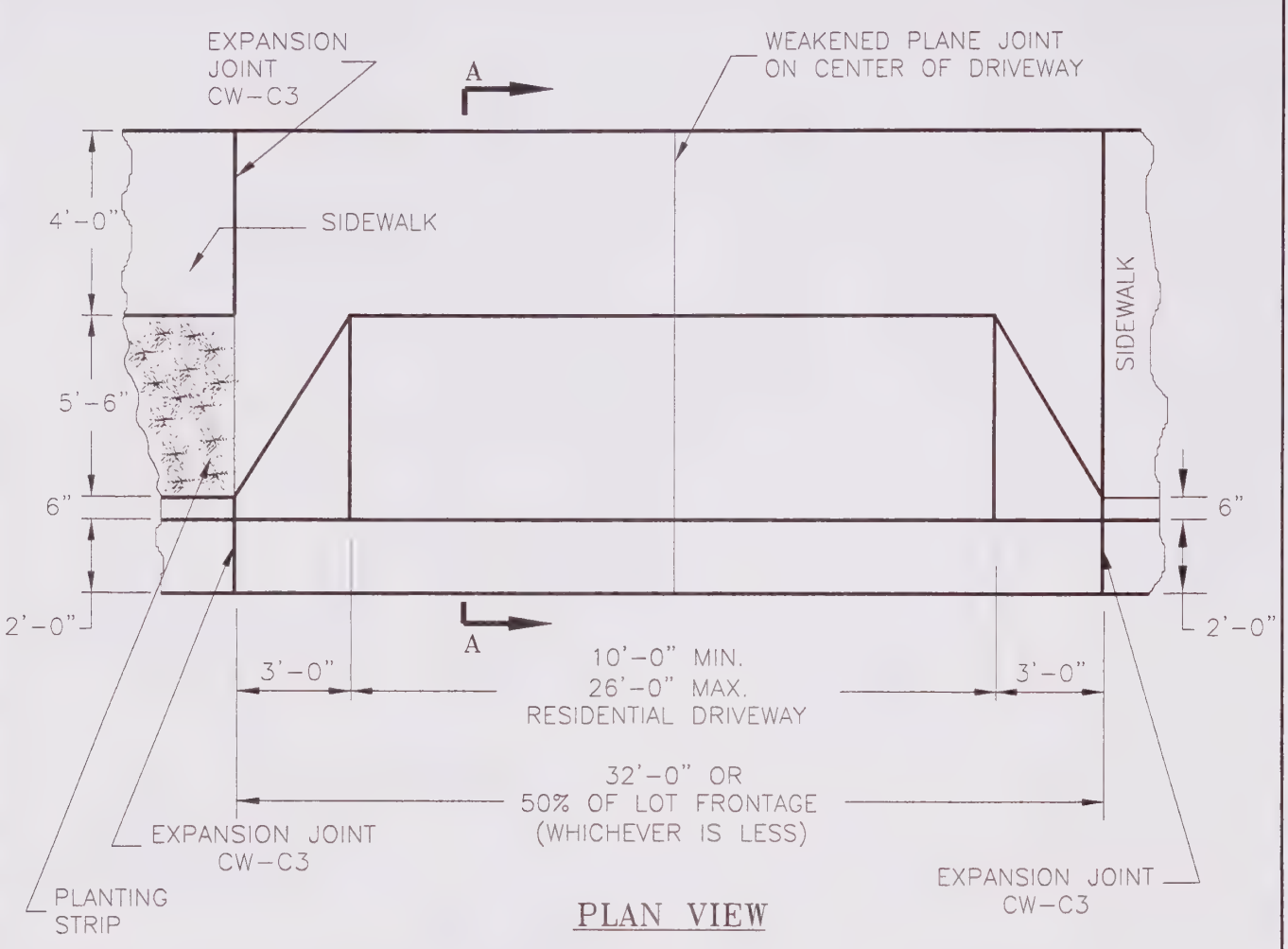
FIRE ACCESS PIPE GATE

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

NEW DRAWING APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 01/09/02

SUPERCEDES DWG. DATED

DRAWING NO. 27D



PLAN VIEW

NOTES:

1. THIS DRIVEWAY TO BE USED ONLY WHERE APPROVED BY THE CITY ENGINEER.
2. DRIVEWAY TO CONFORM WITH EXISTING SIDEWALK. ALL CONCRETE TO BE CLASS B (5 SACK).
3. IF SIDEWALK IN BACK EXISTS, WHERE NEW RAMP TO BE PLACED. IT SHALL BE REMOVED AND REPLACED WITH 6" THICK PORTLAND CEMENT CONCRETE.
4. WHERE HIGH STREET CROWN EXISTS, DRIVEWAY RAMP MAY BE EXTENDED FROM BACK OF WALK TO LIP. DISABILITY RAMPS SHALL BE ACCOMMODATED
5. WHERE DRIVEWAY PROVIDES ACCESS TO A ONE-WAY STREET, APPROPRIATE SIGNS AS SPECIFIED BY THE CITY TRAFFIC ENGINEER WILL BE REQUIRED.
6. DRIVEWAY RAMP SHALL BE AS WIDE AS EXISTING DRIVEWAY INTO YARD, ROUNDED UP TO NEXT EVEN FOOT (10'-0" MINIMUM).
7. IN EVENT OF OBSTRUCTIONS IN PARKWAY (E.G., POWER POLES, ETC.) WIDTH MAY BE MODIFIED TO MEET EXISTING CONDITIONS AS APPROVED BY THE CITY ENGINEER.
8. PARKWAY WARP WINGS SHALL BE 3'-0" FOR 6" CURB OR HIGHER. FOR 4.5" CURB WARP WINGS SHALL BE 2'-0".
9. WHEN IT IS NOT POSSIBLE TO PROVIDE 2'-0" OF FULL HEIGHT WITH STANDARD 3'-0" WARPS ON EITHER SIDE BETWEEN ADJACENT DRIVEWAYS, A COMMON DRIVEWAY SHALL BE INSTALLED.
10. FINE HAIR BROOM FINISH.

REV. NO.	REV. DATE	REV. BY
6	04/07/04	KA
DIGITIZED	7/1/91	

RESIDENTIAL RAMP DRIVEWAY

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 04/07/04

DWG. BY	RC	SCALE
CK. BY		NONE

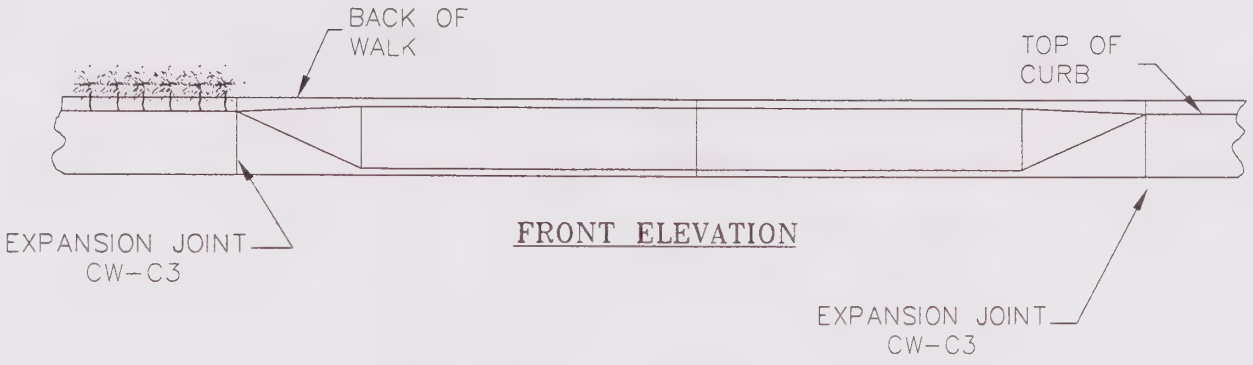
CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

SUPERCEDES DWG. DATED 11/25/03

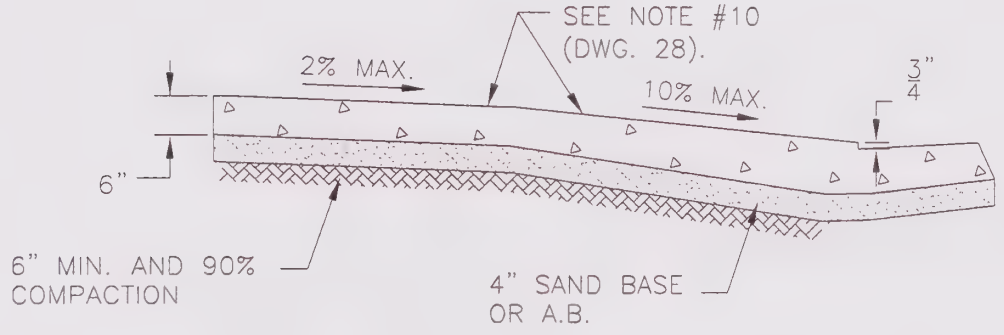
DRAWING NO. 28

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(CONT'D FROM DWG. 28)



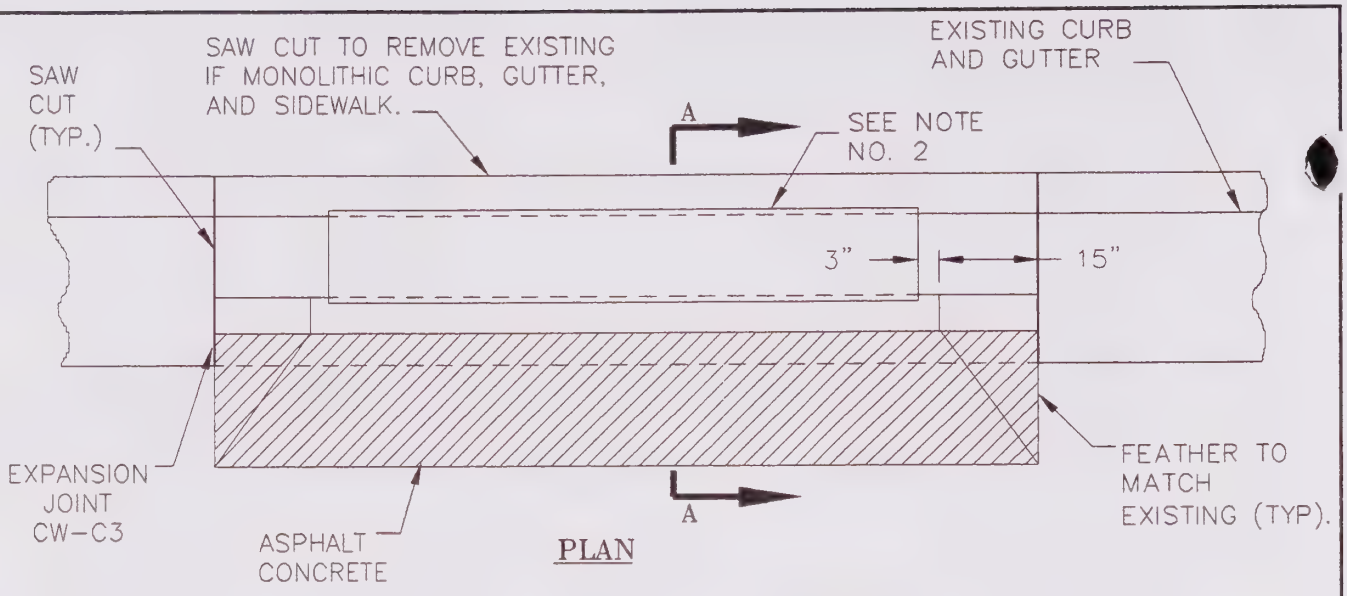
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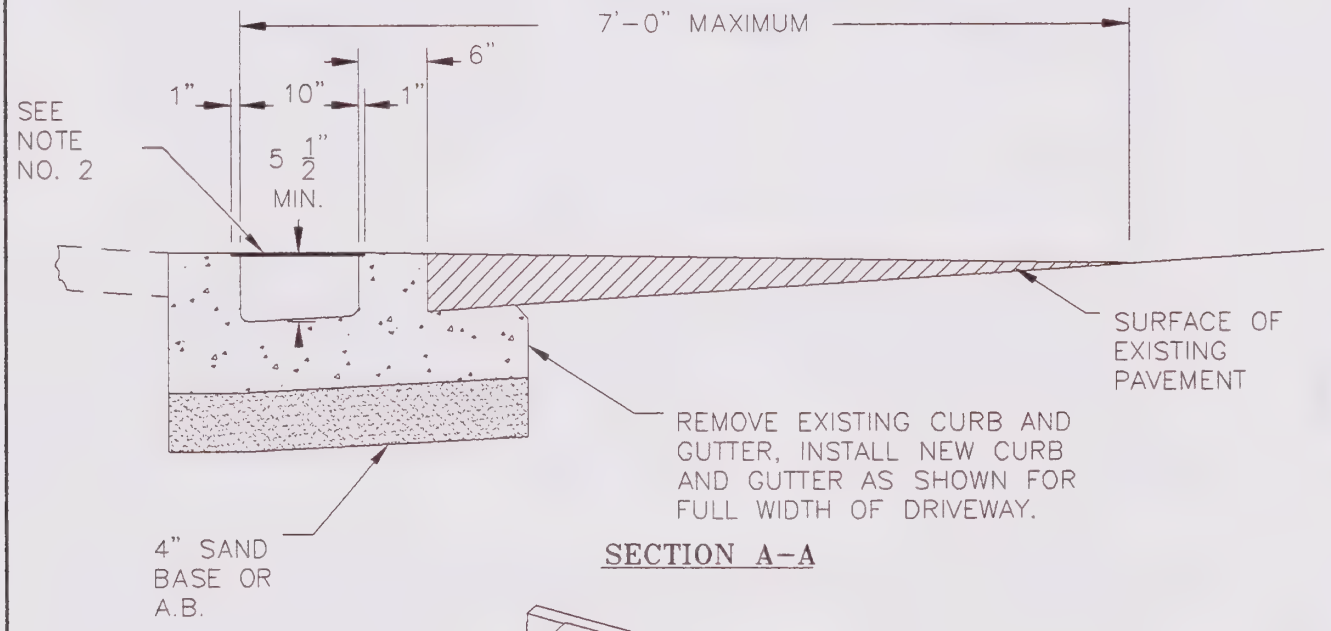
SECTION A - A

REV. NO.	REV. DATE	REV. BY		REVISION APPROVED BY CITY ENGINEER
C	3/30/04	MK	RESIDENTIAL RAMP DRIVEWAY	Finbar J. O'Regan
DIGITIZED	1/1/91			DATE: 04/07/04
DWG. BY RC	SCALE		CITY OF STOCKTON	SUPERCEDES DWG. DATED 01/09/02
CK. BY	NONE		DEPARTMENT OF PUBLIC WORKS	DRAWING NO. 28A

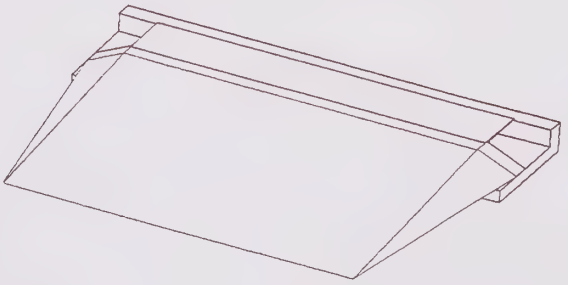
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PLAN



SECTION A-A



3D-VIEW

NOTES:

1. PROPERTY OWNER SHALL BE RESPONSIBLE FOR KEEPING GUTTER CLEAN UNDER STEEL PLATES.
2. 1/2" x 12" STEEL PLATES FOR FULL WIDTH OF DRIVEWAY. MAXIMUM LENGTH OF EACH PLATE 6'-0".
3. FINE HAIR BROOM FINISH ON CONCRETE SURFACES.
4. THIS DRIVEWAY TO BE USED ONLY WHERE APPROVED BY THE CITY ENGINEER.

REV. NO.	REV. DATE	REV. BY
4	6/1/2000	HLE/RH
DIGITIZED	7/1/91	

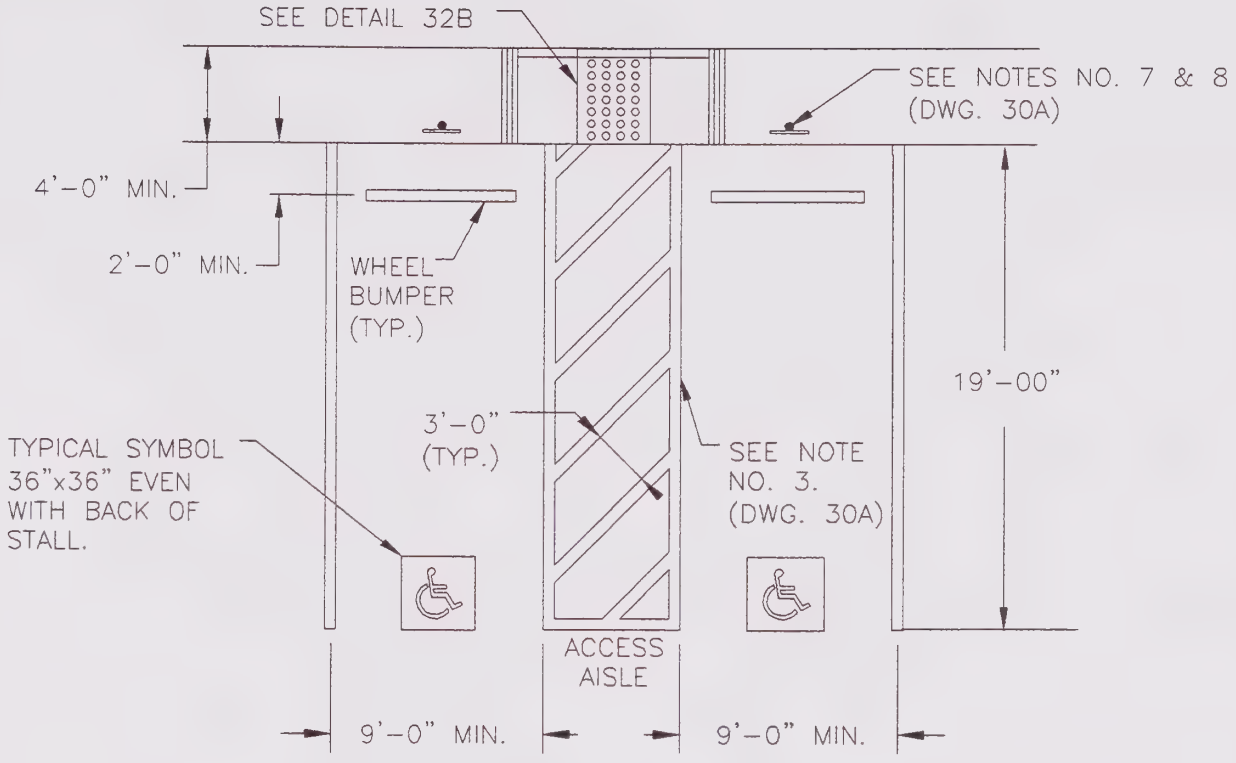
BRIDGE-TYPE-DRIVEWAY

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 01/09/02

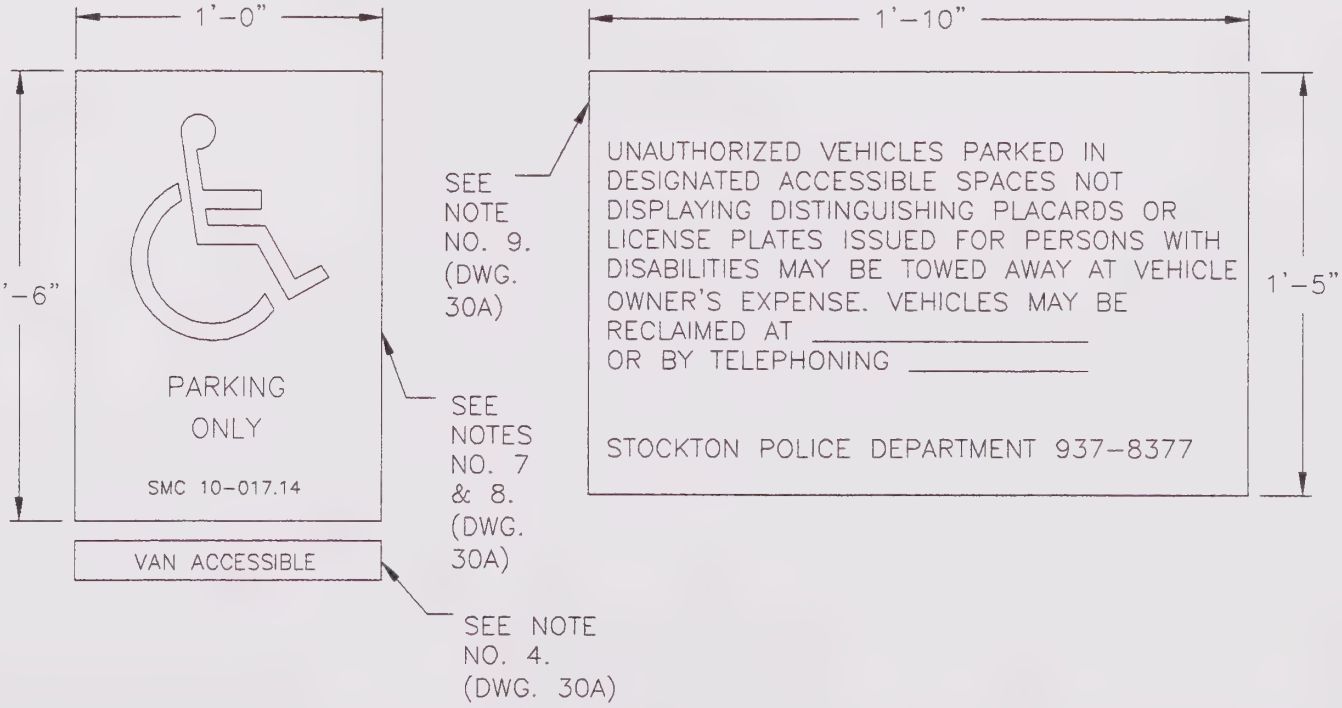
DWG. BY	RC	SCALE
CK. BY		NONE

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

SUPERCEDES DWG. DATED	DRAWING NO.
10/7/93	29



REFER TO: CALTRANS STD PLAN A90



REV. NO.	REV. DATE	REV. BY
3	6/1/2003	HL/EA
DIGITIZED	1/1/92	

DISABLED PARKING

REVISION APPROVED BY CITY ENGINEER
Finbarr J. O'Hagan
DATE: 11/25/03

DWG. BY	DE	SCALE
CK. BY		NONE

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

SUPERCEDES DWG. DATED	DRAWING NO.
01/09/02	30

(CONT'D FROM DWG. 30)

1. IF PARKING STALL IS OUTLINED IN BLUE, THE PROFILE OF THE WHEELCHAIR AND OCCUPANT SHALL BE PAINTED WHITE DIRECTLY ONTO THE PAVEMENT SURFACE.
2. IF PARKING STALL IS OUTLINED IN WHITE, THE PROFILE OF THE WHEELCHAIR AND OCCUPANT SHALL BE PAINTED WHITE ON A BLUE BACKGROUND AND THE ENTIRE STENCIL OUTLINED IN WHITE.
3. ONE IN EVERY EIGHT ACCESSIBLE SPACES, BUT NOT LESS THAN ONE SHALL BE DESIGNATED AS "VAN ACCESSIBLE", WHICH SHALL BE SERVED BY AN ACCESS AISLE MINIMUM OF 8'–0" WIDE.
4. IF VAN ACCESSIBLE, A SUPPLEMENTARY "VAN ACCESSIBLE" SIGN MUST BE ADDED BENEATH "PARKING ONLY" SIGN.

4A. VERTICAL CLEARANCE AT VAN SPACES IS 9'–6" MINIMUM.

5. WHEELCHAIR ACCESS MUST BE PROVIDED TO AN ACCESSIBLE ROUTE TO THE SITE OR BUILDING ENTRANCE WITHOUT GOING BEHIND OTHER PARKED VEHICLES
6. MAXIMUM SLOPE OF PARKING SPACE AND ACCESS AISLE IS 2%.
7. DISABLED PARKING SIGN (TYP.) (LOCATED 6'–8" FROM BOTTOM OF SIGN TO GROUND, OR 3'–0" HIGH ON ADJACENT WALL).
8. 1" MINIMUM LETTER SIZE. SIGN TO BE POSTED AT EACH PARKING STALL.
9. 1" MINIMUM LETTER SIZE. SIGN TO BE POSTED AT EACH ENTRANCE TO PARKING LOT.
10. DISABLED ACCESS REGULATIONS FOR ALTERATIONS, REPAIRS, AND ADDITIONS, B, M, F, AND OCCUPANCIES (REFERENCE TITLE 24).

REV. NO.	REV. DATE	REV. BY
3	6/1/2003	HL/EA
DIGITIZED	1/1/92	
DWG. BY DE	SCALE	
CK. BY	NONE	

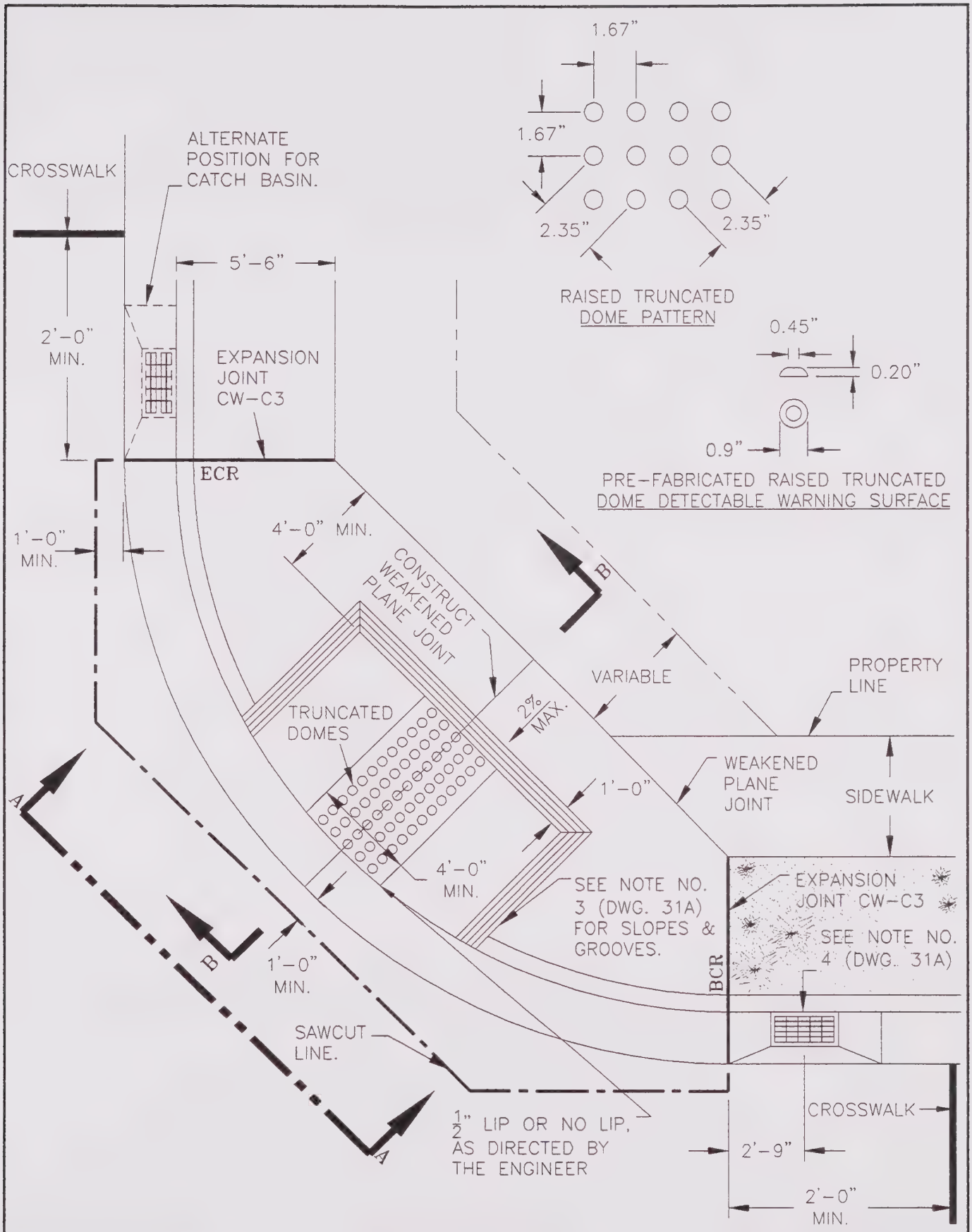
DISABLED PARKING

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 11/25/03

SUPERCEDES DWG. DATED 01/09/02

DRAWING NO. 30A



REV. NO.	REV. DATE	REV. BY
7	6/1/2003	HL/EA
DIGITIZED	7/1/91	
DWG. BY RC	SCALE	
CK. BY	NONE	

TYPICAL WHEELCHAIR RAMP AT INTERSECTIONS

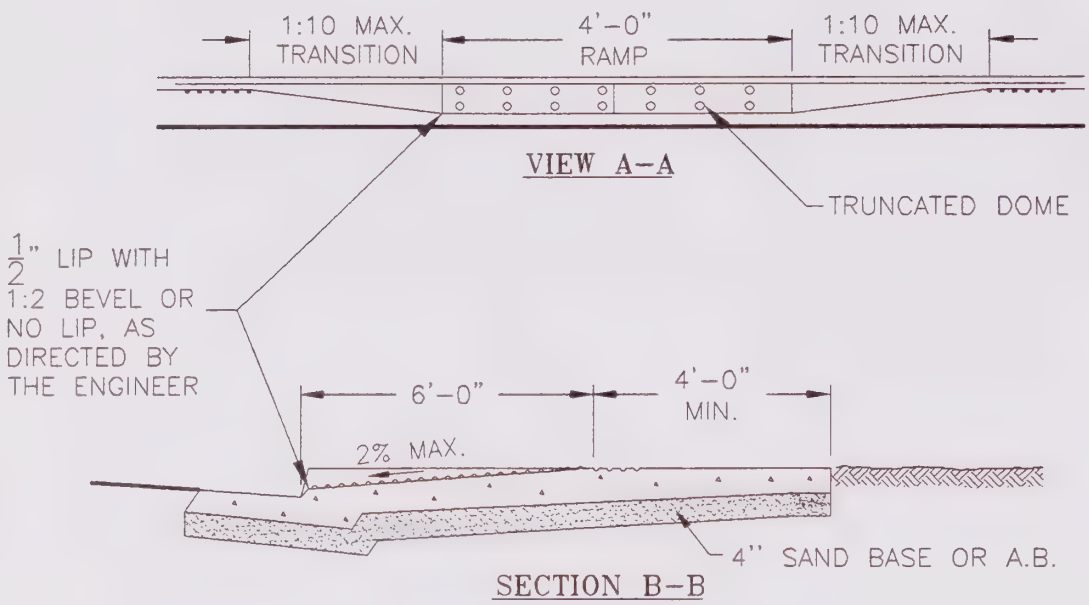
CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 11/25/03

SUPERCEDES DWG. DATED 01/09/02

DRAWING NO. 31

(CONT'D FROM DWG. 31)



NOTES:

1. TOTAL FLOWLINE DROP, ECR TO BCR SHALL BE MINIMUM 0.01 FT/FT. ALONG THE ARCLENGTH OF CORNERS.
2. MAINTAIN 4 FT. MIN. FROM BACK OF RAMP TO BACK OF SIDEWALK.
3. FOR NONSTANDARD APPLICATIONS MAINTAIN THE FOLLOWING MAXIMUM SLOPES AS DIRECTED BY THE ENGINEER:

   MAXIMUM TRANSITION SIDE SLOPES 1:10
   MAXIMUM RAMP SLOPE 1:12
   GROOVES ARE APPROXIMATELY .....¼", ¾" O.C.

4. INSTALL CATCH BASIN AT CURB RETURN. LOCATE AS SHOWN ON DWG 31.
5. FINE HAIR BROOM FINISH.

REV. NO.	REV. DATE	REV. BY
7	6/1/2003	HL/EA
DIGITIZED	7/1/91	
DWG. BY	RC	SCALE
CK. BY		NONE

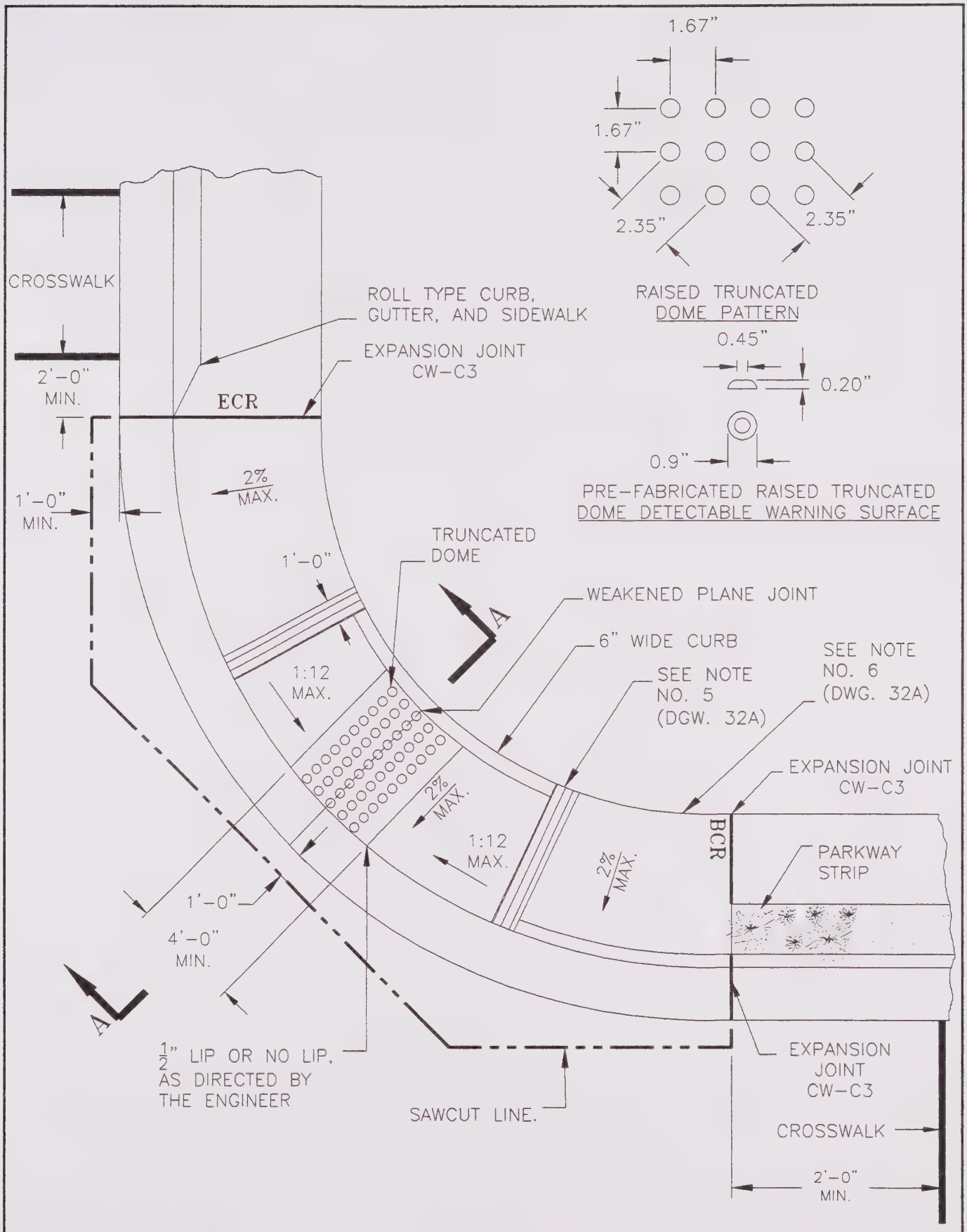
TYPICAL WHEELCHAIR RAMP AT INTERSECTIONS

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 11/25/03

SUPERCEDES DWG. DATED 01/09/02

DRAWING NO. 31A



REV. NO.	REV. DATE	REV. BY
6	6/1/2003	HL/EA
DIGITIZED	7/1/91	
DWG. BY RC	SCALE	
CK. BY	NONE	

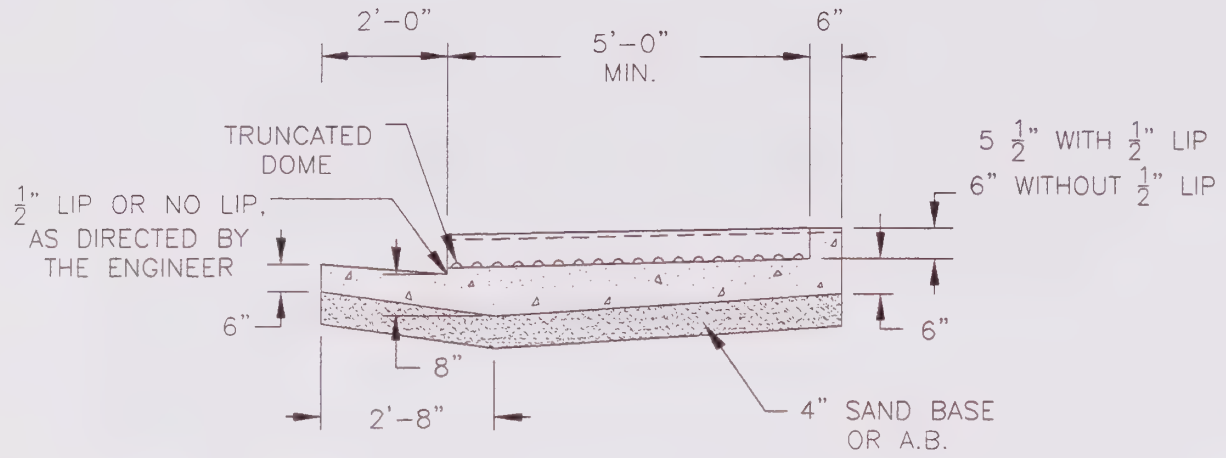
SPECIAL WHEELCHAIR RAMP INSTALLATION

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

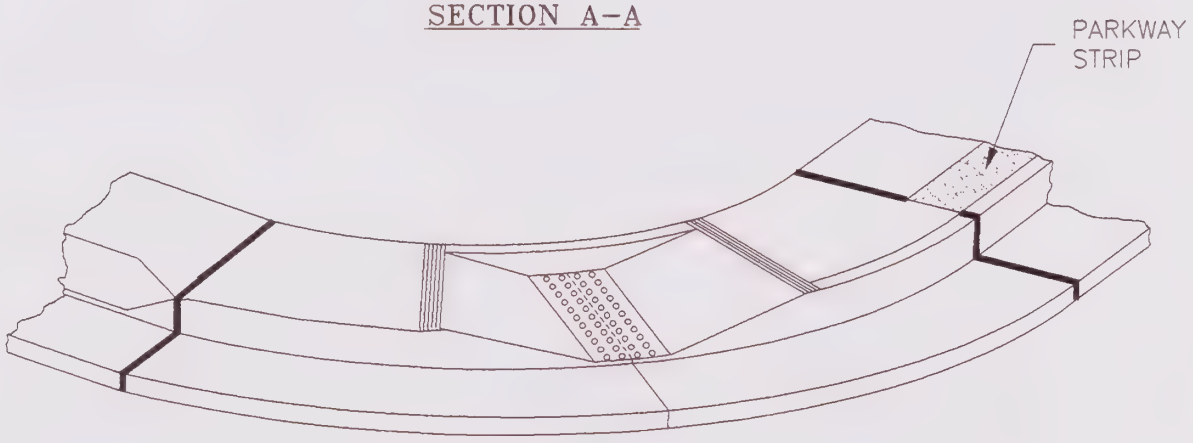
REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 11/25/03

SUPERCEDES DWG. DATED	DRAWING NO.
01/09/02	32

(CONT'D FROM DWG. 32)



SECTION A-A



PICTORIAL VIEW

NOTES:

1. THIS DESIGN TO BE USED FOR RECONSTRUCTION WORK ONLY WHERE R/W RESTRICTIONS DO NOT PERMIT THE USE OF STANDARD NO. 31.
2. THIS PLAN SHALL NOT BE USED ON NEW SUBDIVISION WORK.
3. THIS PLAN SHALL BE USED ONLY WITH THE APPROVAL OF THE CITY ENGINEER.
4. WHEELCHAIR RAMP SHALL BE FROM BCR TO ECR, INCLUDING CURB AND GUTTER.
5. CONSTRUCT GROOVES PER DRAWING NO. 31.
   A. MAXIMUM RAMP SLOPE.....2%
   B. MAXIMUM TRANSITION SIDE SLOPES.....1:12
6. FINE HAIR BROOM FINISH.

REV. NO.	REV. DATE	REV. BY
6	6/1/2003	HL/EA
DIGITIZED	7/1/91	
DWG. BY RC	SCALE	
CK. BY	NONE	

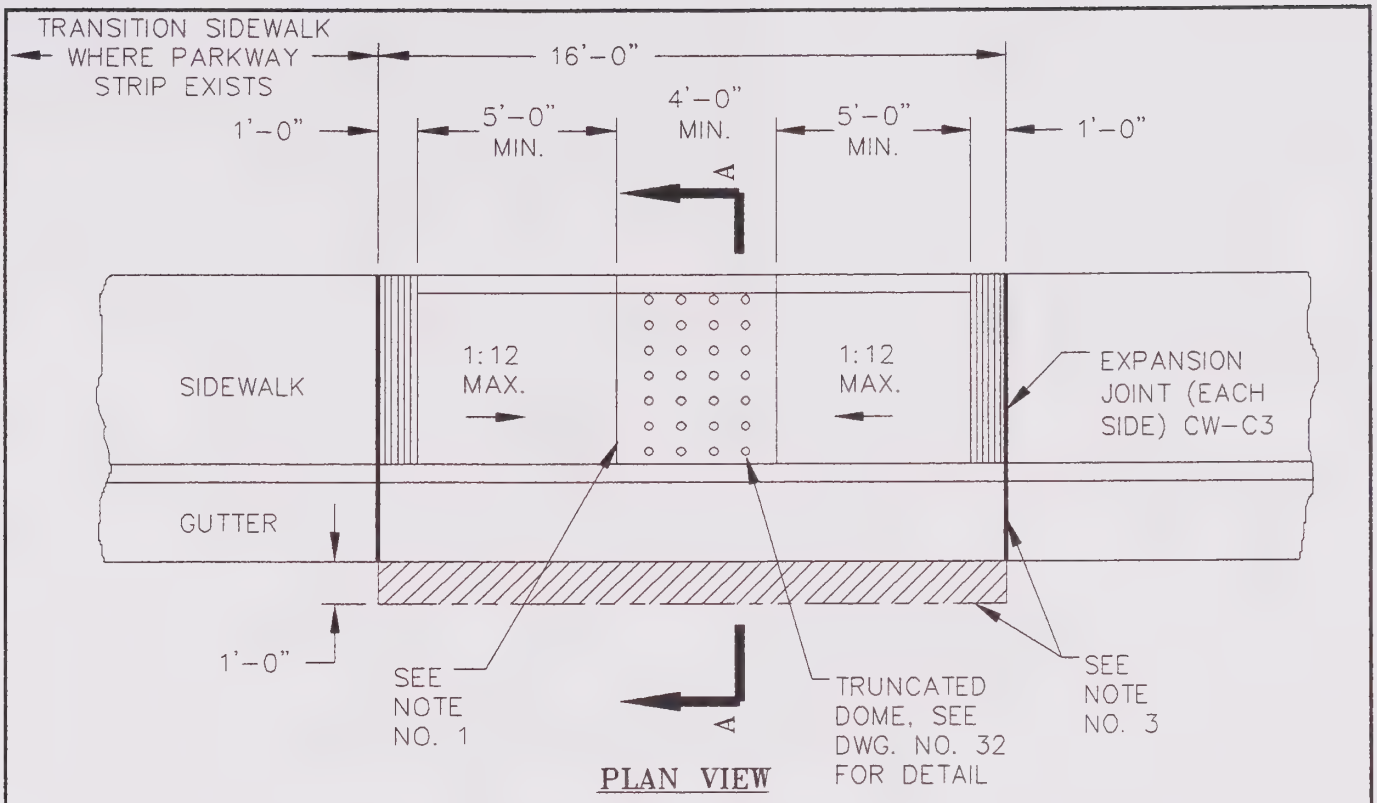
SPECIAL WHEELCHAIR RAMP INSTALLATION

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

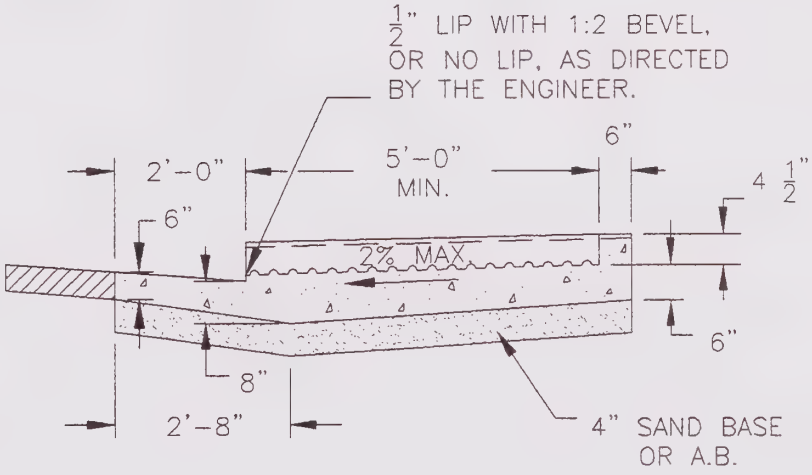
REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 11/25/03

SUPERCEDES DWG. DATED 01/09/02

DRAWING NO. 32A



PLAN VIEW



SECTION A-A

NOTES:

1. MAXIMUM CROSS SLOPE OF RAMP.....2%
   MAXIMUM TRANSITION SIDE SLOPE.....1:12
   GROOVES ARE APPROXIMATELY.....$\frac{1}{4}$", $\frac{3}{4}$" O.C.
2. KEY SIDEWALK PER DRAWING NO. 26
3. SAWCUT EXISTING ASPHALT AND CONCRETE TO BE REMOVED. REPLACE PAVEMENT WITH 8" ASPHALT CONCRETE MINIMUM (THICKER WHERE REQUIRED).
4. FINE HAIR BROOM FINISH.

REV. NO.	REV. DATE	REV. BY
5	6/1/2003	HL/EA
DIGITIZED	7/1/91	
DWG. BY	RC	SCALE
CK. BY		NONE

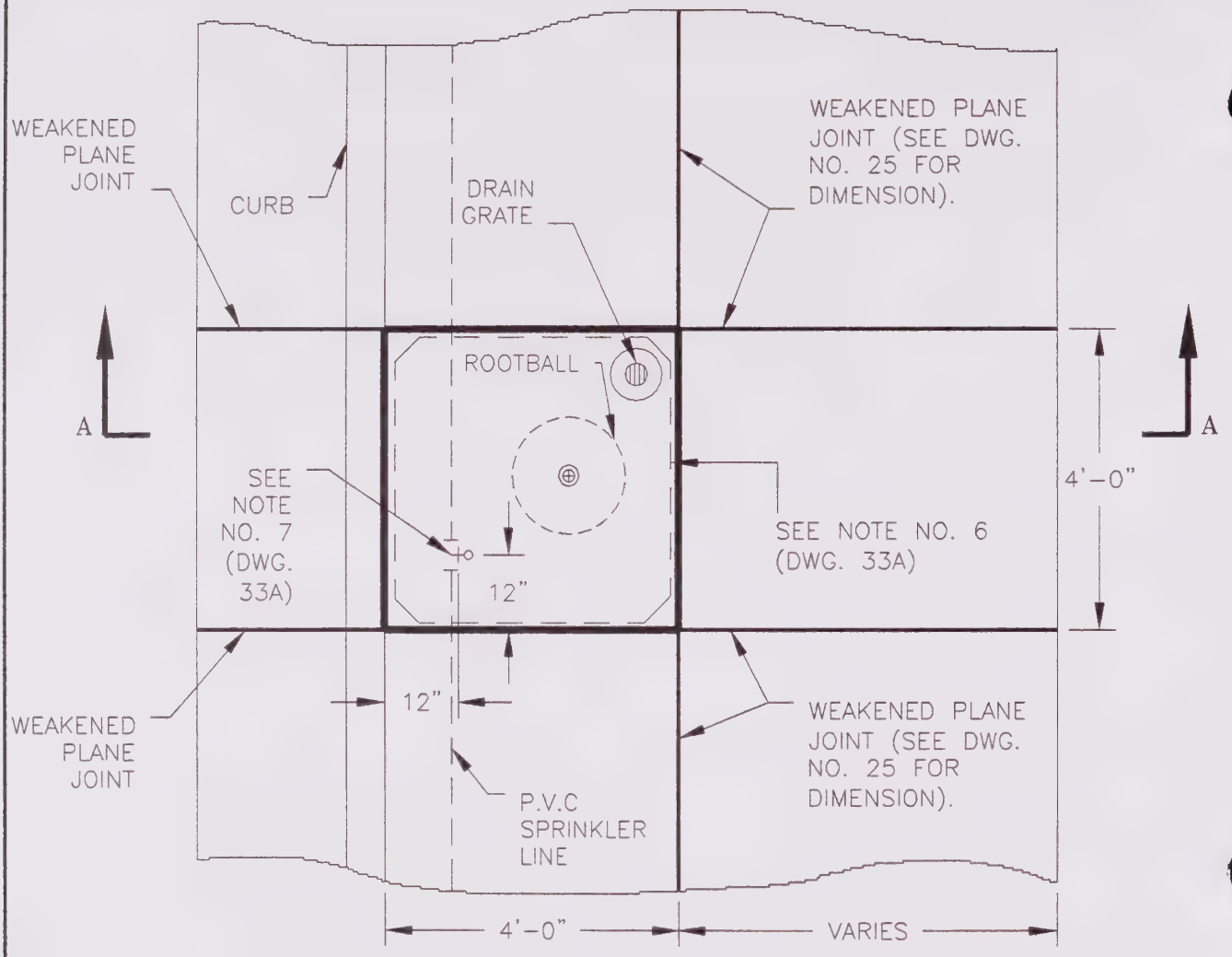
SPECIAL WHEELCHAIR RAMP AT MIDBLOCK

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 11/25/03

SUPERCEDES DWG. DATED 01/09/02

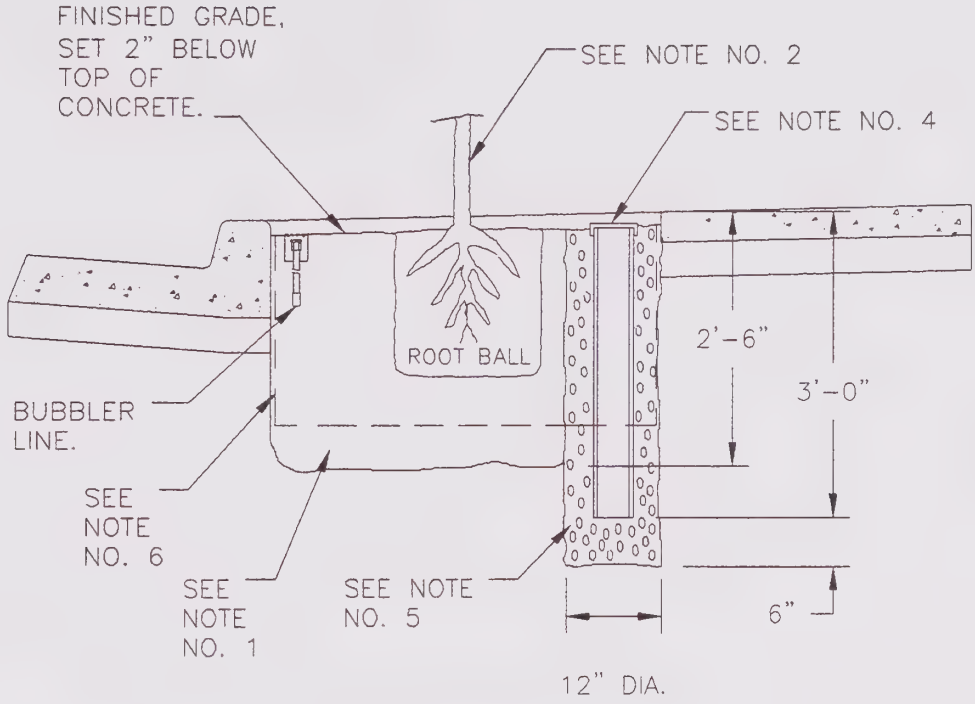
DRAWING NO. 32B



PLAN

REV. NO.	REV. DATE	REV. BY	TREE WELL DETAIL	REVISION APPROVED BY CITY ENGINEER
5	6/1/2000	HLE/RH		Finbar J. O'Regan
DIGITIZED	7/1/91			DATE: 11/25/03
DWG. BY RC	SCALE		CITY OF STOCKTON	SUPERCEDES DWG. DATED 01/09/02
CK. BY	NONE		DEPARTMENT OF PUBLIC WORKS	DRAWING NO. 33

(CONT'D FROM DWG. 33)



SECTION A – A

NOTES:

1. BACK FILL SHALL BE FRIABLE LOAM, TYPICAL OF CULTIVATED TOPSOIL LOCALLY, CONTAINING AT LEAST 2% HUMUS. IT SHALL BE REASONABLY FREE OF SUBSOIL, STONES, CLODS, STICKS, OR OTHER OBJECTIONABLE EXTRANEOUS MATTER OR DEBRIS. IT SHALL NOT CONTAIN TOXIC MATERIALS.
2. IF CONTRACTOR TO PLANT TREES, CITY ORDINANCE # 030-92CS SECTION 16-172.1 REQUIRES THAT THE TREES SHALL BE PLANTED IN ACCORDANCE TO CITY PARKS AND RECREATION STANDARD DRAWING NO. 33G AND VARIETY SELECTED FROM OFFICIAL PLANTING LIST. LANDSCAPE PLANS MUST BE SUBMITTED AND APPROVED BY THE CITY LANDSCAPE ARCHITECT AND A PLANTING PERMIT OBTAINED PRIOR TO PLANTING.
3. COMPLETE IRRIGATION SYSTEM PLANS INCLUDING VALVES, VACUUM BREAKER, PIPE SIZING AND ROUTING, SPRINKLER TYPE, AND CONTROLLER LOCATION, ETC. SHALL BE SUBMITTED BY A LICENSED ENGINEER EXPIERIENCED WITH IRRIGATION DESIGN OR LICENSED LANDSCAPE ARCHITECT FOR APPROVAL AS A PART OF THE IMPROVEMENT PLANS. THE SYSTEM SHALL BE INSTALLED BY A LICENSED LANDSCAPE CONTRACTOR.
4. 4" DIAMETER ABS PERFORATED PIPE WITH PLASTIC DRAIN GRATE. GRATE AND PIPE TO BE COMPATIBLE PLASTIC FOR SOLVENT WELDING. SET DRAIN GRATE 2" BELOW TOP OF SIDEWALK AND AT FINISHED GRADE.
5. 3/4" DRAIN ROCK.
6. ROOT BARRIER, MODEL UB 24-2 (7 PANELS) AS MANUFACTURED BY DEEP ROOT CORP. OR APPROVED EQUAL (SET TOP 1" ABOVE FINISHED GRADES).
7. BUBBLER SPRINKLER HEAD RAINBIRD, 1400 SERIES BUBBLER. SEE DETAIL DRAWING NO. 33E AND 33F.

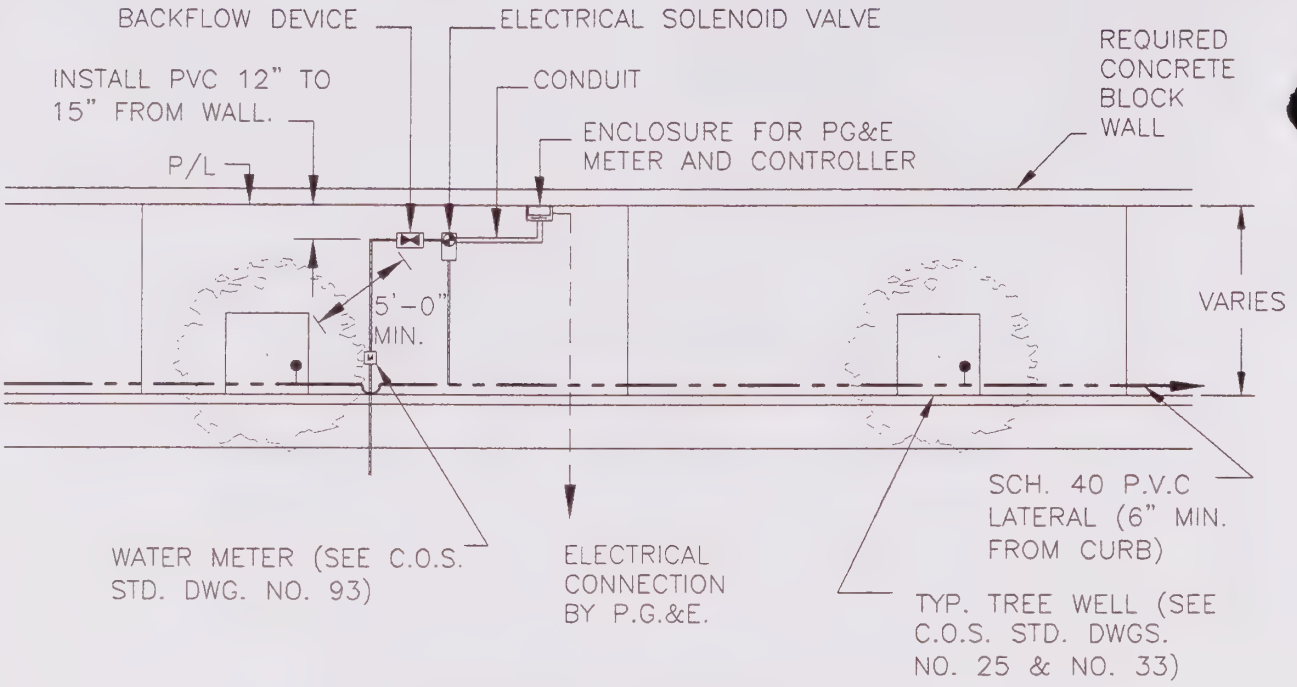
REV. NO.	REV. DATE	REV. BY
5	6/1/2000	HLE/RH
DIGITIZED	7/1/91	
DWG. BY	RC	SCALE
CK. BY		NONE

TREE WELL DETAIL

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 01/09/02

SUPERCEDES DWG. DATED	DRAWING NO.
2/23/95	33A



DIAGRAMMATIC IRRIGATION LAYOUT

IRRIGATION LEGEND	
KEY	DESCRIPTION
M	WATER METER INSTALLED BY OTHERS. SEE C.O.S. STANDARD DRAWING NO. 93.
	REDUCED PRESSURE BACKFLOW DEVICE (SEE STANDARD DRAWING NO. 97).
	24 VOLT SOLENOID VALVE. GRISWOLD MODEL DWS OR EQUAL (IN CONC. VALVE BOX) (SEE COS STANDARD DRAWING NO. 33D).
	PVC SCH. 40 LATERAL WITH BUBBLER (PER C.O.S. STANDARD DRAWING NO. 33 AND NO. 33E).
	PVC SCH. 80 CONDUIT (SEE CABINET DETAIL STANDARD DRAWING NO. 33F).
	P.G.&E METER AND RAINBIRD ESP CONTROLLER INSTALLED IN A TESCO CABINET WITH CONDUIT. CABINET AS PER TESCO DWG. NO. COS-112790 OR EQUAL (SEE COS STANDARD DRAWING NO. 33F).

NOTE:

SUBMIT LANDSCAPE & IRRIGATION PLANS FOR CITY APPROVAL.

REV. NO.	REV. DATE	REV. BY
4	6/1/2000	HL/EA
DIGITIZED	7/1/91	
DWG. BY	RC	SCALE
CK. BY		NONE

TYPICAL TREE WELL
IRRIGATION SYSTEM REQUIREMENTS
CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbarr J. O'Kegan
DATE: 11/25/03

SUPERCEDES DWG. DATED	DRAWING NO.
01/09/02	33B

(CONT'D FROM DWG. 33B)

NOTES:

1. THE ENGINEER OR ARCHITECT SHALL USE DRAWING NO. 33B AS A GENERAL GUIDELINE FOR IRRIGATION REQUIREMENTS RELATING TO STREET FRONTAGE IMPROVEMENTS WHERE TREE WELLS WILL BE INSTALLED.
2. THE DIAGRAMMATIC IRRIGATION LAYOUT IS AN EXAMPLE OF MINIMUM REQUIRED INFORMATION FOR CONSTRUCTION PURPOSES. AN IRRIGATION PLAN SUBMITTAL IS REQUIRED AND SHALL SHOW ALL POINTS OF INSTALLATION AND CONNECTION AND PROVIDE INSTALLATION AND CONNECTION DETAILS. PIPES, VALVES, BACKFLOW PREVENTION, WIRING, ETC., SHALL BE PROPERLY SIZED AND INDICATED ON THE SUBMITTED PLANS.
3. PLANS SHALL SHOW ENTIRE PROJECT AREA UNDER REVIEW WITH PROPOSED IRRIGATION SYSTEM, ETC.
4. DETAILS GIVEN ARE DIAGRAMMATIC AND SHALL NOT BE DIRECTLY COPIED ONTO WORKING DRAWINGS. THESE DETAILS SHOW MATERIAL REQUIREMENTS BY THE CITY AND SERVE AS EXAMPLES OF REQUIRED INFORMATION FOR INSTALLATION BY A LICENSED LANDSCAPE CONTRACTOR.
5. SIZE SYSTEM COMPONENTS AS NECESSARY FOR FUTURE EXPANSION AS REQUIRED BY CITY.

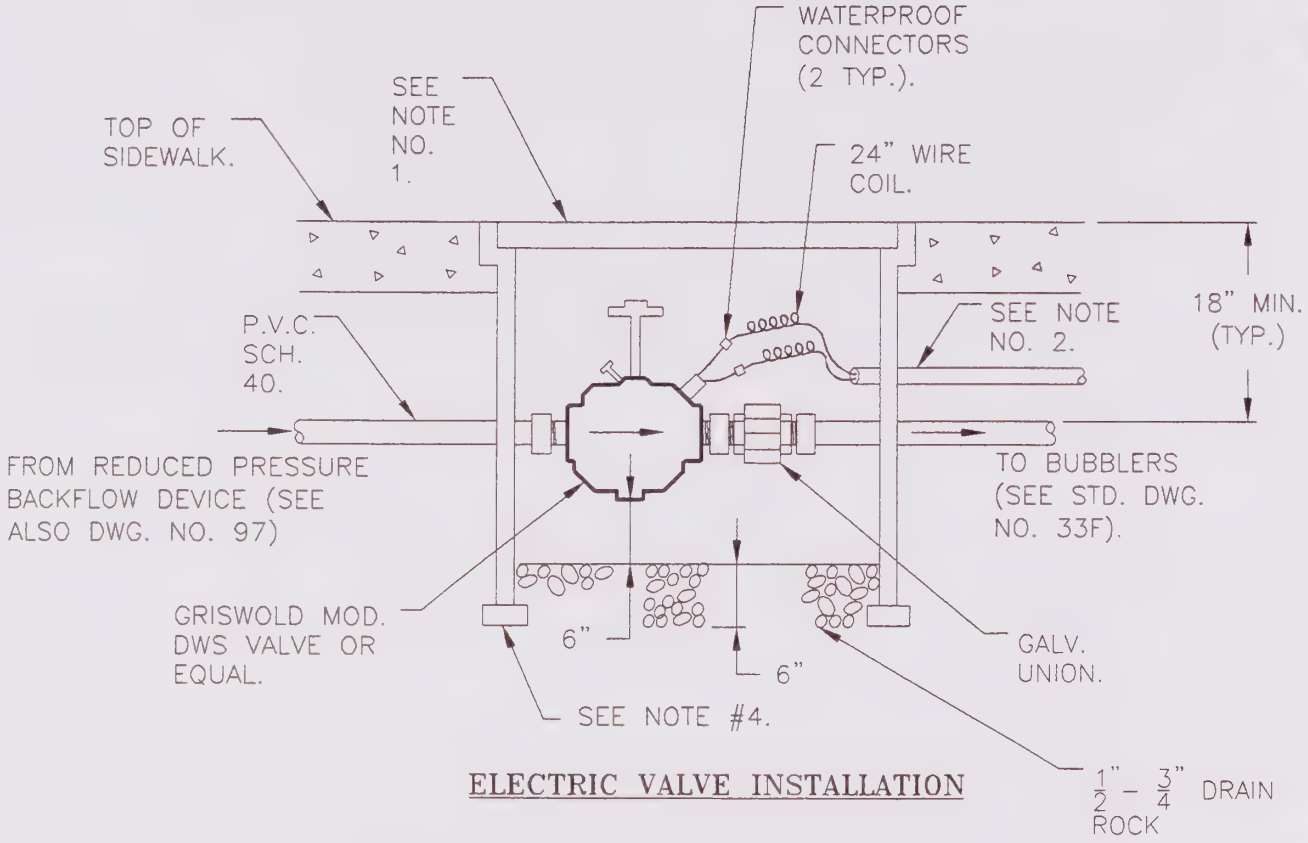
REV. NO.	REV. DATE	REV. BY
3	6/1/2000	HLE/RH
DIGITIZED	7/1/91	
DWG. BY	RC	SCALE
CK. BY		NONE

TYPICAL TREE WELL
IRRIGATION SYSTEM REQUIREMENTS

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 01/09/02

SUPERCEDES DWG. DATED	DRAWING NO.
2/23/95	33C

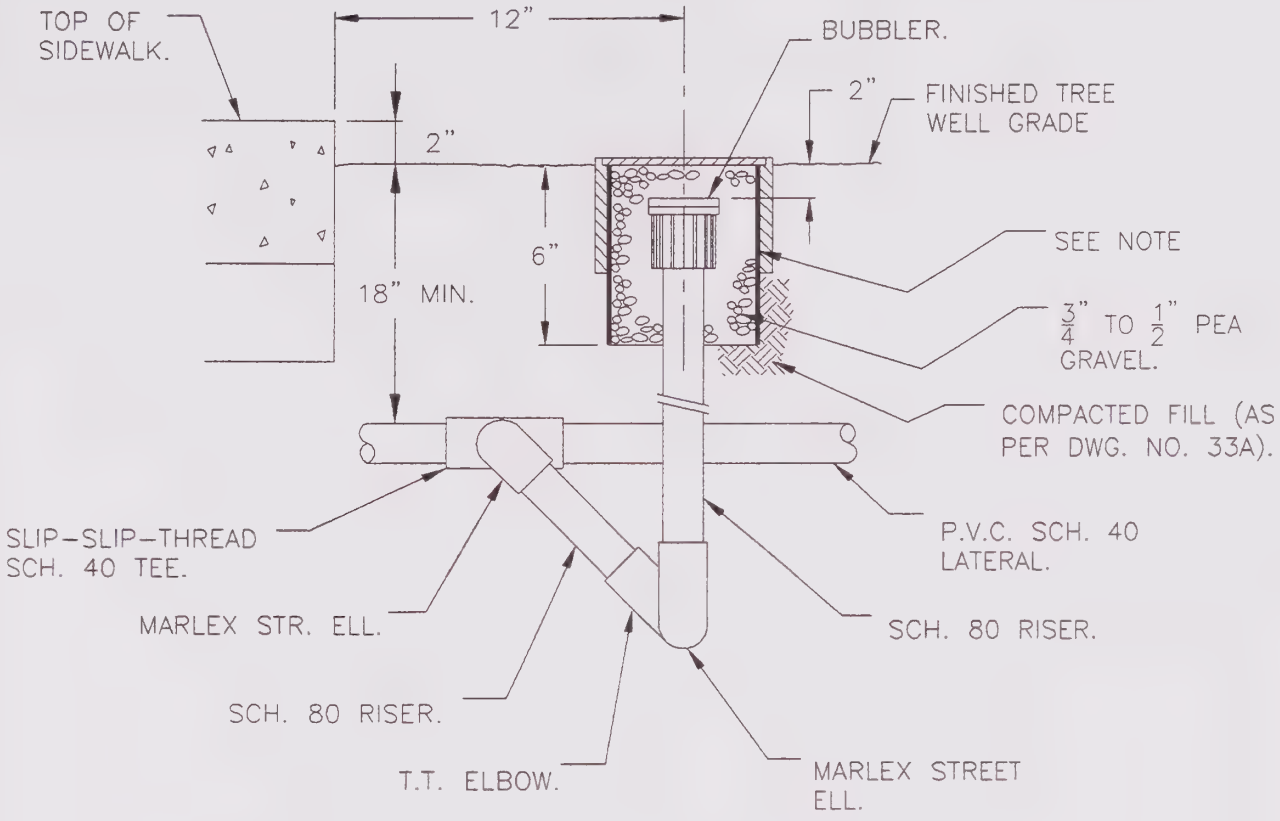


ELECTRIC VALVE INSTALLATION

NOTES:

1. CHRISTY CONCRETE VALVE BOX WITH BOLT DOWN COVER OR APPROVED EQUAL (SIZE AS REQUIRED).
2. 14 GAUGE UL APPROVED DIRECT BURY WIRE, 2 STRANDS, IN 1" CONDUIT TO CONTROLLER. ONE STRAND SHALL BE WHITE FOR COMMON (CONDUIT SHALL BE EXTENDED TO CONST. LIMITS FOR FUTURE VALVES).
3. SCH. 80 NIPPLES AND UNIONS MAY BE USED WHEN SUPPORT POSTS ARE INSTALLED.
4. CONTRACTOR SHALL PROVIDE ADEQUATE FOUNDATION TO ASSURE STABILITY OF ALL VALVE BOXES.

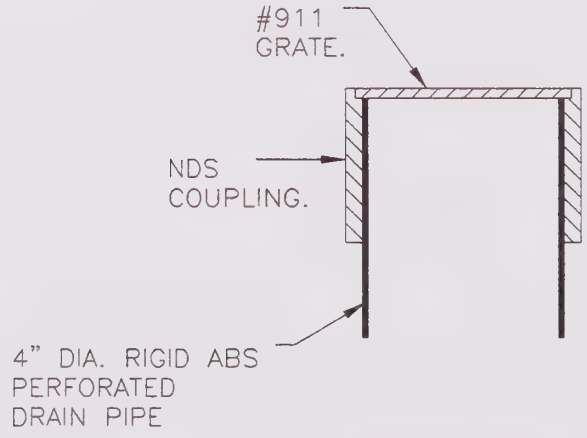
REV. NO.	REV. DATE	REV. BY	TYPICAL TREE WELL IRRIGATION SYSTEM REQUIREMENTS	REVISION APPROVED BY CITY ENGINEER Finbar J. O'Regan DATE: 01/09/02	
2	6/1/2000	HLR/RH			
DIGITIZED	7/1/91				
DWG. BY RC	SCALE		CITY OF STOCKTON DEPARTMENT OF PUBLIC WORKS	SUPERCEDES DWG. DATED 10/7/93	DRAWING NO. 33D
CK. BY	NONE				



BUBBLER INSTALLATION

(SEE C.O.S STD. DWG. NO. 33 AND 33A)

NOTE: 4" DIA. PVC SCH. 40 SECTION OF PIPE WITH NDS COUPLING AND #911 GRATE.



GRATE DETAIL

REV. NO.	REV. DATE	REV. BY
2	6/1/2000	HLE/RH
DIGITIZED	7/1/91	
DWG. BY	RC	SCALE
CK. BY		NONE

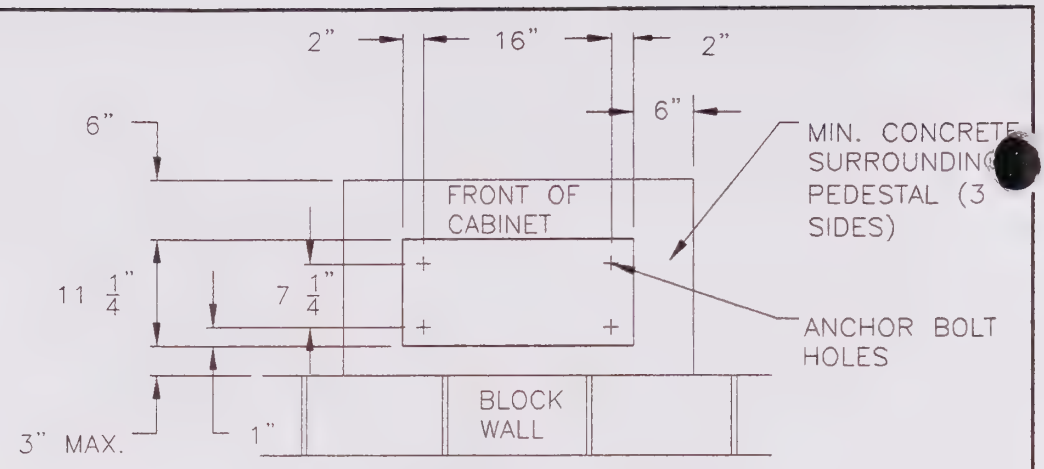
TYPICAL TREE WELL
IRRIGATION SYSTEM REQUIREMENTS

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

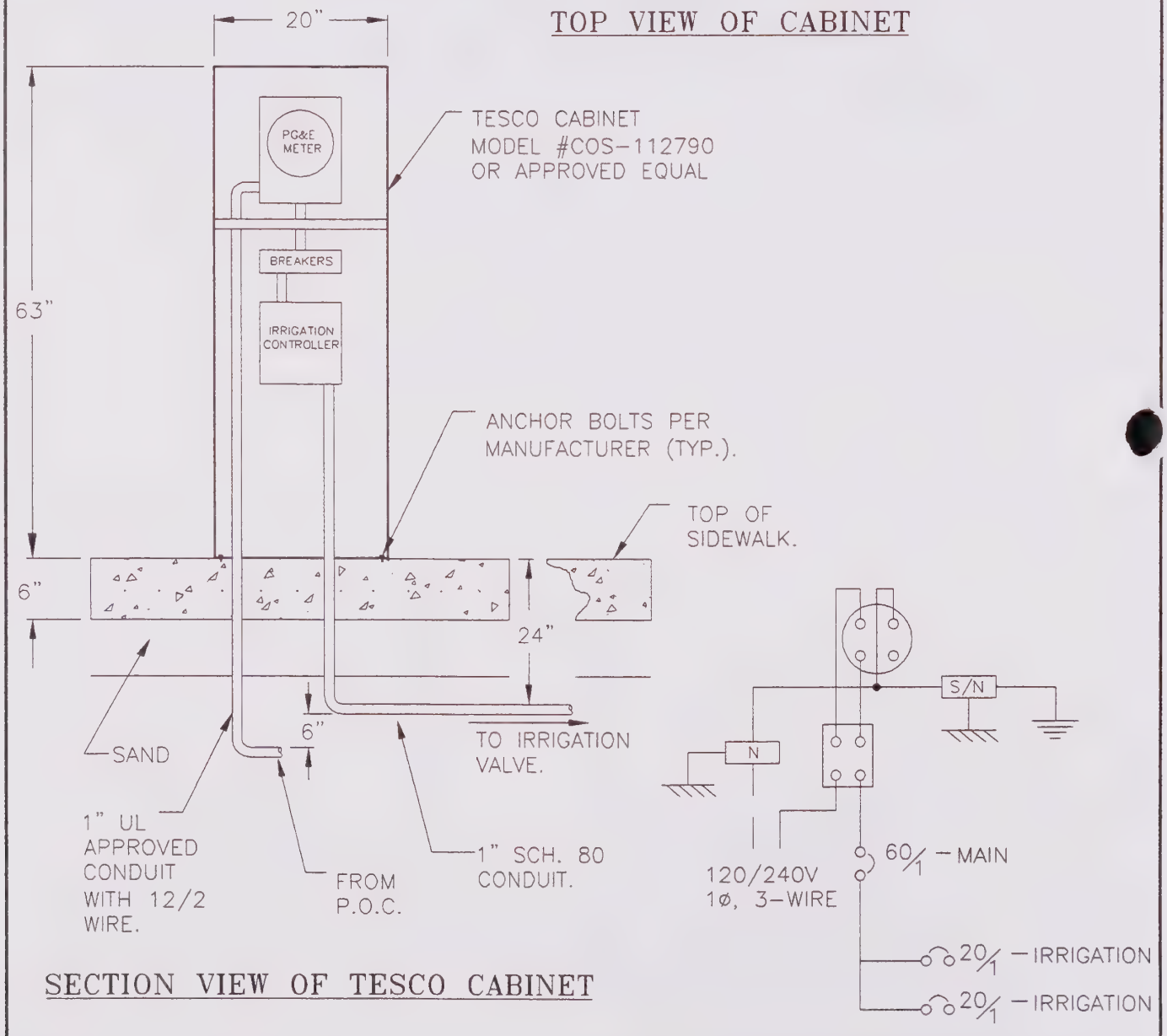
REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 01/09/02

SUPERCEDES DWG. DATED 2/23/95

DRAWING NO. 33E



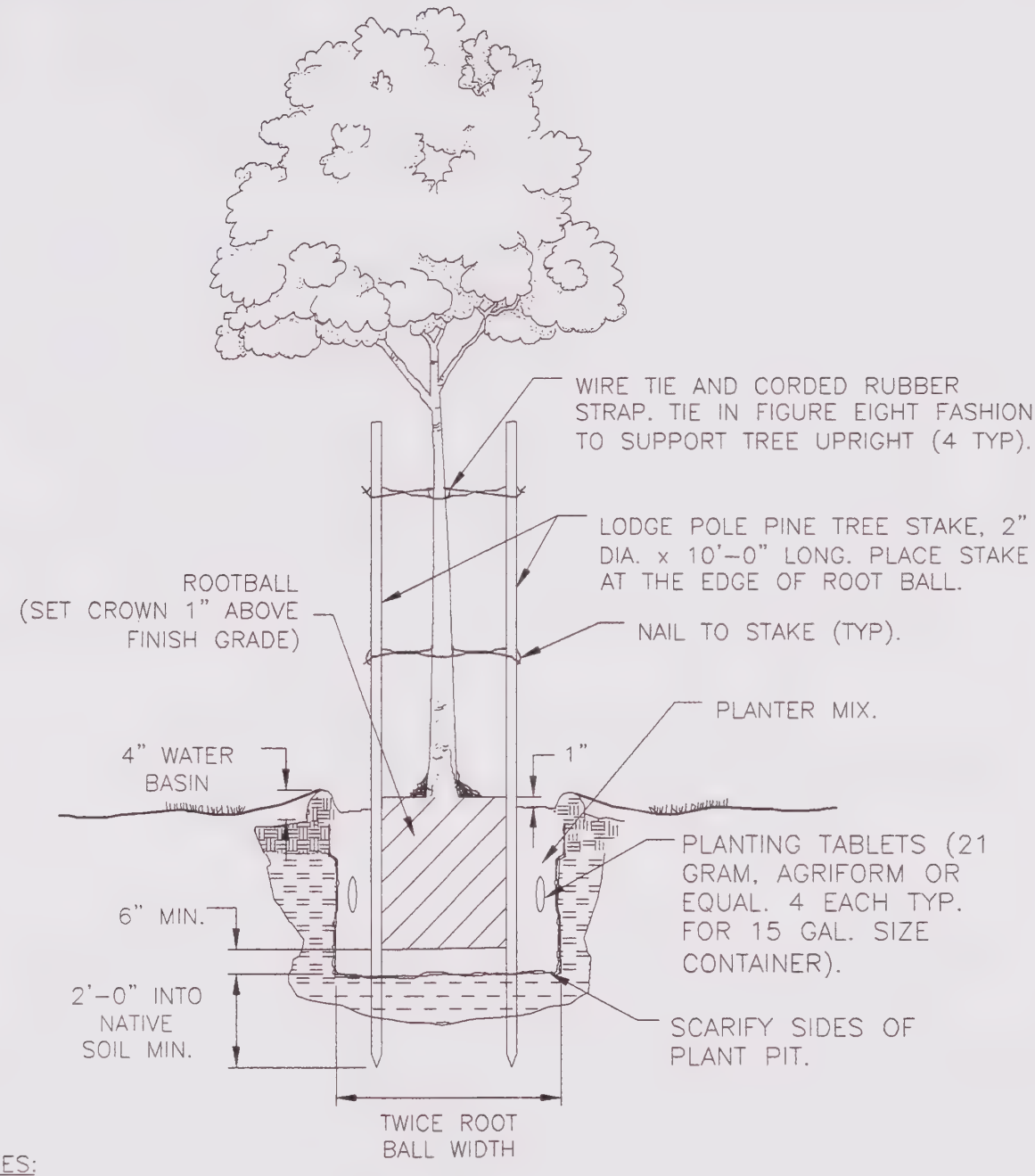
TOP VIEW OF CABINET



SECTION VIEW OF TESCO CABINET

PANEL DIAGRAM

REV. NO.	REV. DATE	REV. BY	TYPICAL TREE WELL IRRIGATION SYSTEM REQUIREMENTS	REVISION APPROVED BY CITY ENGINEER
3	6/1/2003	HL/EA		Finbar J. O'Regan DATE: 11/25/03
DIGITIZED	7/1/91			
DWG. BY RC	SCALE		CITY OF STOCKTON DEPARTMENT OF PUBLIC WORKS	SUPERCEDES DWG. DATED 1/9/02
CK. BY	NONE			DRAWING NO. 33F



NOTES:

1. OMIT WATERING BASIN WHEN INSTALLING IN TREE WELL + SET FINISH GRADE AT 2" BELOW TOP OF CONCRETE.
2. WHERE A 5'-6" WALK EXISTS, IRRIGATION WILL BE PROVIDED BY PROPERTY OWNER + TREE SHALL BE INSTALLED 4'-6" FROM BACK OF CURB + MIN. 4'-6" FROM ANY UTILITY LINE OR CONCRETE. THIS NOTE DOES NOT APPLY TO BACK-UP SITUATIONS.
3. WATER-IN THOROUGHLY AFTER PLANTING.
4. TREE PLANTED IN TREE WELLS OR PARKWAYS SHALL REQUIRE A ROOT BARRIER AS PER DRAWING NO. 33.
5. PLANTING PERMIT AND APPROVED LANDSCAPE/IRRIGATION PLANS REQUIRED PRIOR TO PLANTING.

REV. NO.	REV. DATE	REV. BY
2	6/1/2000	HLE/RH
DIGITIZED	10/7/93	
DWG. BY	SA	SCALE
CK. BY		NONE

TYPICAL TREE PLANTING DETAIL

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

NEW DRAWING APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 01/09/02

SUPERCEDES DWG. DATED	DRAWING NO.
2/23/95	33G

(CONT'D FROM DWG. 33G)

NOTES:

AT THE CITY'S OPTION, NEW OR REDEVELOPED AREAS MAY ELECT TO INSTALL A 5'-6" WALK IN LIEU OF 10'-0" WALK WITH TREE WELLS AND AN IRRIGATION SYSTEM. THIS MAY BE DONE PROVIDING THE FOLLOWING CONDITIONS ARE MET:

1. IRRIGATION SHALL BE PROVIDED BY THE OWNERS PRIVATE LANDSCAPE IRRIGATION SYSTEM.
2. THE BALANCE OF THE PUBLIC EASEMENT SHALL BE MAINTAINED IN PERPETUITY BY THE PROPERTY OWNER (O.D.S.) AND A MAINTENANCE AGREEMENT SHALL BE FILED WITH THE CITY OR THE AREA SHALL BE INCORPORATED INTO THE CITY'S CONSOLIDATED LANDSCAPE MAINTENANCE DISTRICT.
3. COMPLETE LANDSCAPE PLANS INCLUDING ALL CONSTRUCTION ELEMENTS, IRRIGATION PLAN, PLANTING PLAN, CONSTRUCTION PLAN, ETC., SHALL BE SUBMITTED TO THE CITY AND APPROVED MAINTENANCE AGREEMENT/DISTRICT ESTABLISHED PRIOR TO START OF WORK.
4. WHEN LANDSCAPING IS TO BE MAINTAINED BY A MAINTENANCE DISTRICT, O.D.S. SHALL MAINTAIN SUCH LANDSCAPING UNTIL THE MAINTENANCE DISTRICT OFFICIALLY TAKEN OVER.

IN REDEVELOPED AREAS WHERE THE DEVELOPER ELECTS TO INSTALL A 10'-0" WALK WITH TREE WELLS, THE MAIN WATER SUPPLY OF THE IRRIGATION SYSTEM SHALL BE TAKEN AT THE EXISTING PRIVATE WATER METER WHICH SERVES THE INTERIOR STRUCTURES.

REV. NO.	REV. DATE	REV. BY
2	6/1/2000	HLE/RH
DIGITIZED	10/7/93	
DWG. BY	SA	SCALE
CK. BY		NONE

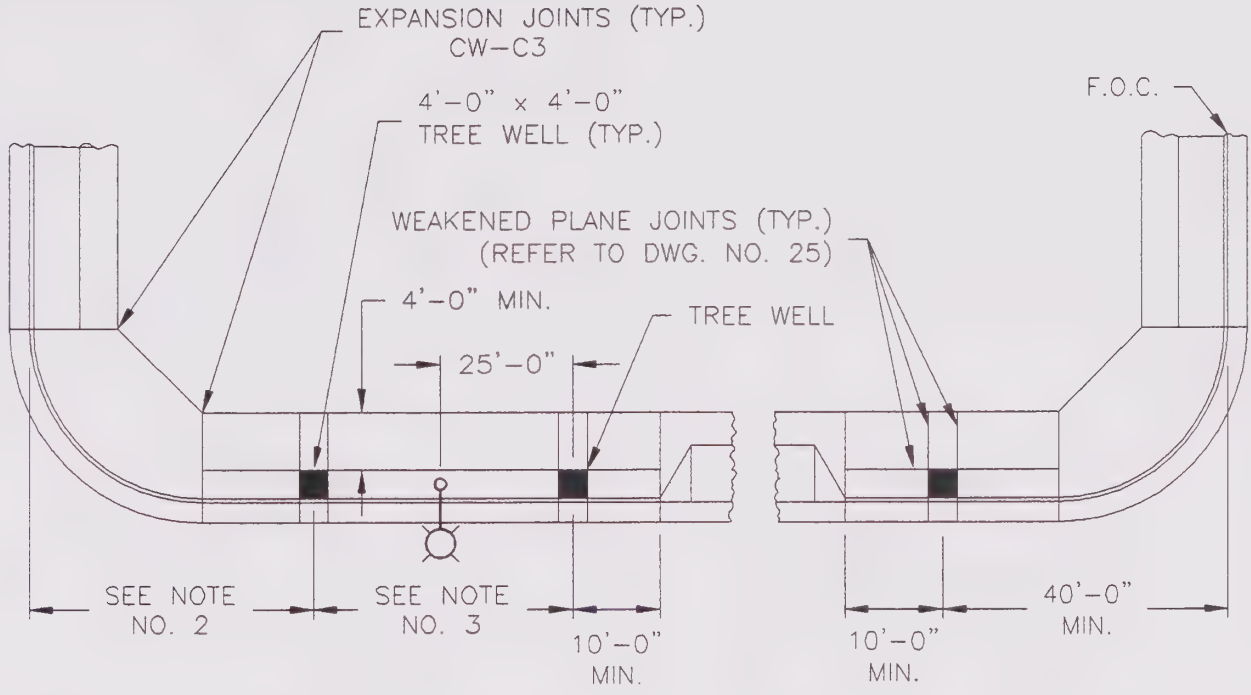
ADDITIONAL TREE PLANTING NOTES

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

NEW DRAWING APPROVED BY CITY ENGINEER
Finbarr J. O'Regan
DATE: 01/09/02

SUPERCEDES DWG. DATED 6/1/94

DRAWING NO. 33H



DIRECTION OF TRAFFIC

NOTES:

1. STREET LIGHT SHALL BE INSTALLED 25'–0" MINIMUM FROM CENTER OF TREE WELL TO STREET LIGHT.
2. MINIMUM OF 100'–0" BETWEEN THE FACE OF THE CROSS–STREET CURB AND THE CENTER OF THE FIRST TREE WELL ON MAJOR ARTERIALS. MINIMUM OF 40'–0" ON ALL OTHER CITY STREETS. BOTH INSTALLATIONS SUBJECT TO APPROVAL BY THE CITY ENGINEER.
3. SPACING OF TREE WELLS SHALL BE 30'–0" MINIMUM; 50'–0" MAXIMUM EQUALLY DIVIDED THROUGHOUT BLOCK, UNLESS OTHERWISE APPROVED BY THE CITY ENGINEER.
4. STANDARD SIZE OF TREE WELLS IS 4'–0" x 4'–0". WHEN APPROVED BY THE CITY ENGINEER, A MINIMUM 3'–0" DIMENSION MAY BE USED.
5. ALL NEW OR IMPROVED COMMERCIAL FRONTAGE SHALL HAVE TREE WELLS IF MONOLITHIC SIDEWALK IS INSTALLED. PLANS SHALL BE SUBMITTED TO THE CITY ENGINEER FOR APPROVAL.
6. SEE "TYPICAL TREE WELL DETAIL" DRAWING NO. 33.
7. AVOID UTILITY SERVICE EQUIPMENT BY A MINIMUM OF 6'–0".
8. PROVIDE BUBBLER SPRINKLER HEAD TO EACH TREE WELL FROM ADJACENT LANDSCAPE AREA OR WATER SOURCE. FOR BACK–UP FRONTAGES, LOCATION OF METER AND VALVE TO BE APPROVED BY CITY ENGINEER.
9. TREE WELLS AT COMMERCIAL PROPERTY FRONTAGE SHALL BE SERVED BY COMMERCIAL PROPERTY WATER METER.

REV. NO.	REV. DATE	REV. BY
5	6/1/2000	HLE/RH
DIGITIZED	1/1/92	
DWG. BY	RC	SCALE
CK. BY		NONE

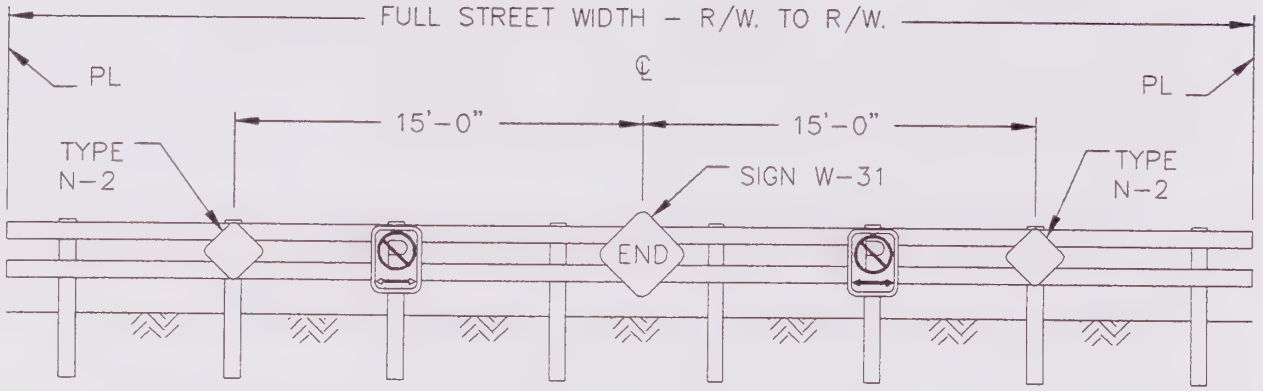
TREE WELL INSTALLATION

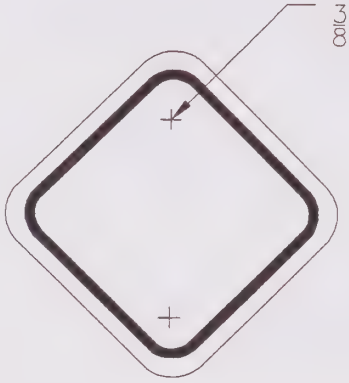
CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbarr J. O'Regan
DATE: 01/09/02

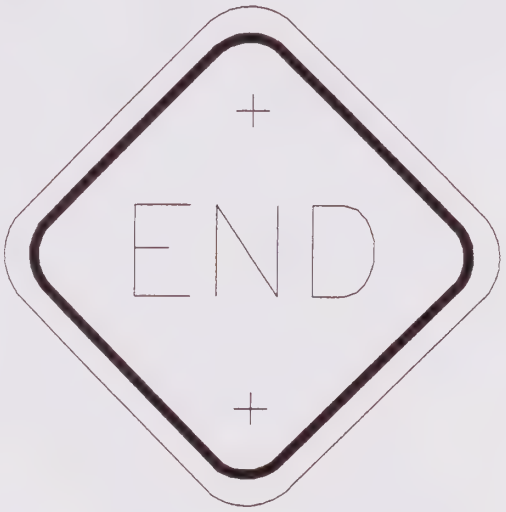
SUPERCEDES DWG. DATED 6/1/94

DRAWING NO. 34





REFLECTOR SIGN – CALTRANS TYPE N–2, SIZE 18" x 18".



CALTRANS W–31
(STANDARD 30" SIGN – YELLOW)



NOTES:

1. BARRICADE TO BE PAINTED WHITE. USING TWO COATS OF "EXTERIOR ALKYD RESIN HI–GLOSS ENAMEL" OVER A COMPATIBLE PRIMER – APPLY REFLECTIVE GLASS BEADS COATING.
2. FOR MARKERS, SEE CALTRANS TRAFFIC MANUAL, CHAPTER 6.

REV. NO.	REV. DATE	REV. BY
5	6/1/2000	HLE/RH
DIGITIZED	7/1/90	
DWG. BY RC	SCALE	
CK. BY	NONE	

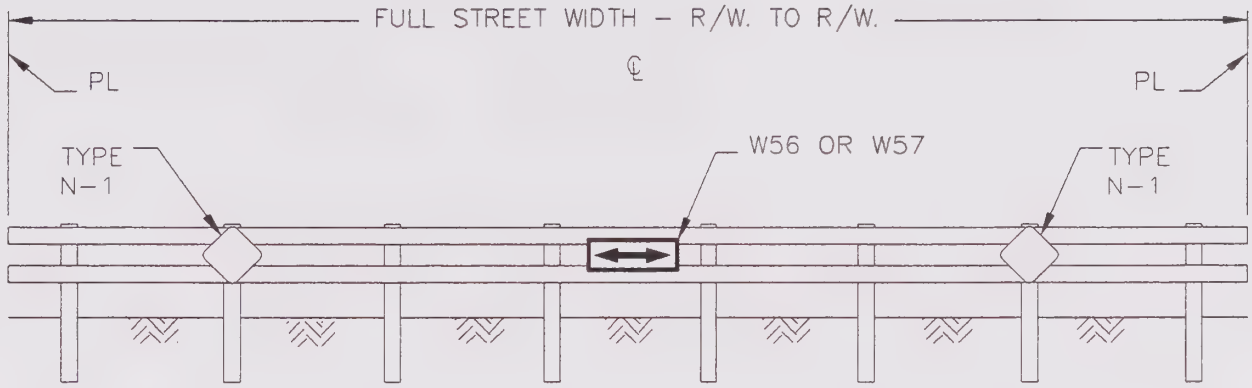
BARRICADE FOR TERMINATING STREETS

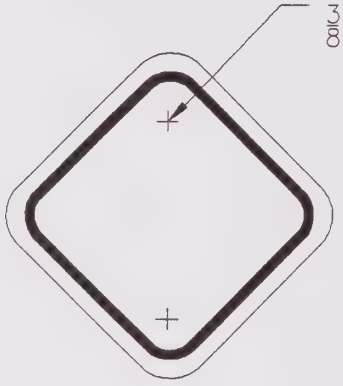
CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 01/09/02

SUPERCEDES DWG. DATED 2/23/95

DRAWING NO. 35





REFLECTOR SIGN – CALTRANS N–1, SIZE 18" x 18"



W56 (FOR T–INTERSECTION)



W57 (FOR RIGHT OR LEFT TURN ONLY)

CALTRANS W56 OR W57
(STANDARD 30" SIGN – YELLOW)

NOTES:

1. BARRICADE TO BE PAINTED WHITE. USING TWO COATS OF "EXTERIOR ALKYD RESIN HI–GLOSS ENAMEL" OVER A COMPATIBLE PRIMER – APPLY REFLECTIVE GLASS BEADS COATING.
2. FOR MARKERS, SEE CALTRANS TRAFFIC MANUAL, CHAPTER 6.

REV. NO.	REV. DATE	REV. BY
5	6/1/2000	HLE/RH
DIGITIZED	7/1/90	
DWG. BY	RC	SCALE
CK. BY		NONE

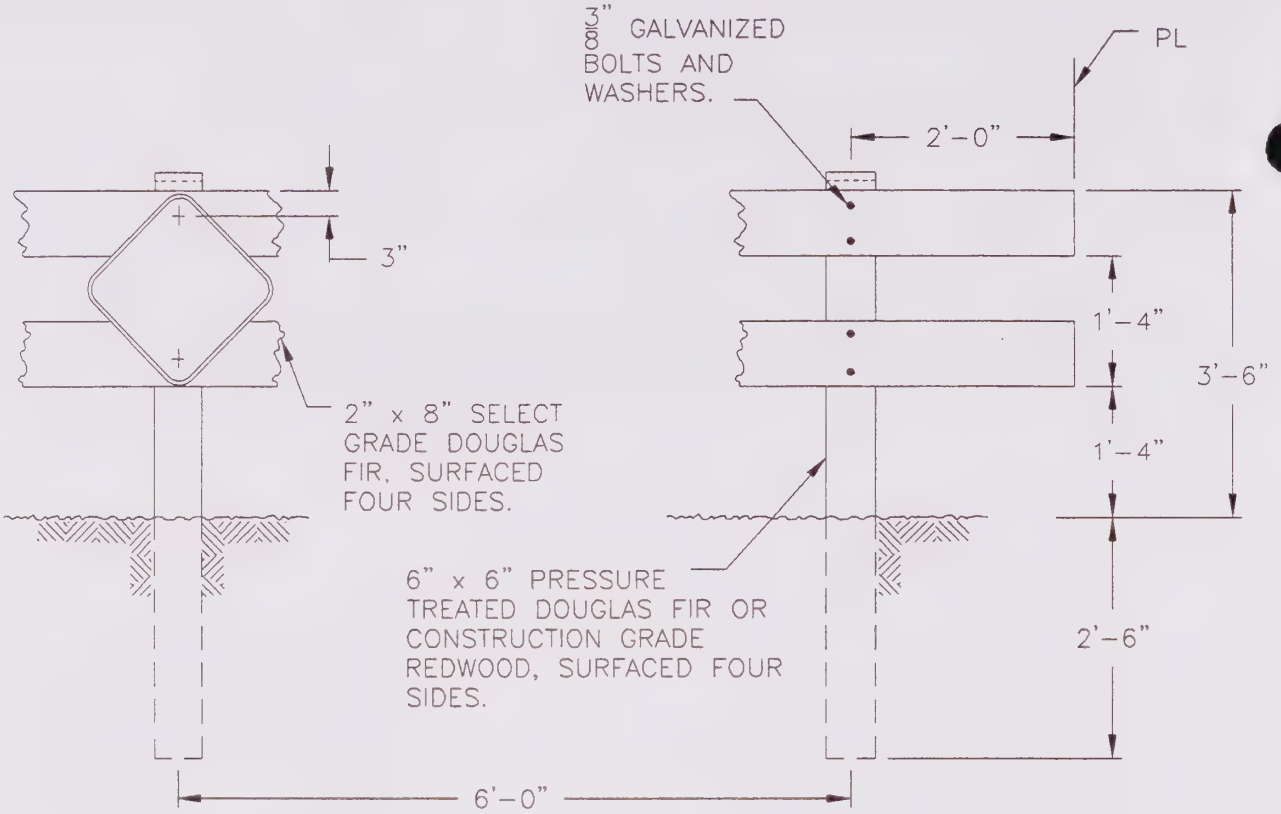
BARRICADE FOR ENDING STREET WITH INTERSECTION STREET

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

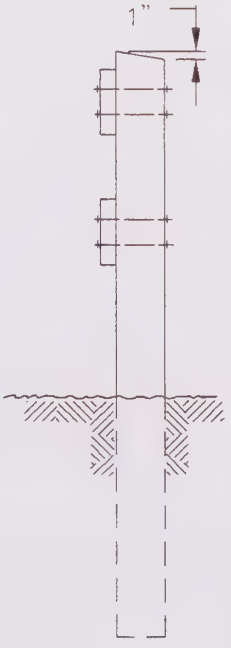
REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 01/09/02

SUPERCEDES DWG. DATED 2/23/95

DRAWING NO. 35A



FRONT VIEW



END VIEW

REV. NO.	REV. DATE	REV. BY
5	6/1/2000	HLE/RH
DIGITIZED	7/1/90	

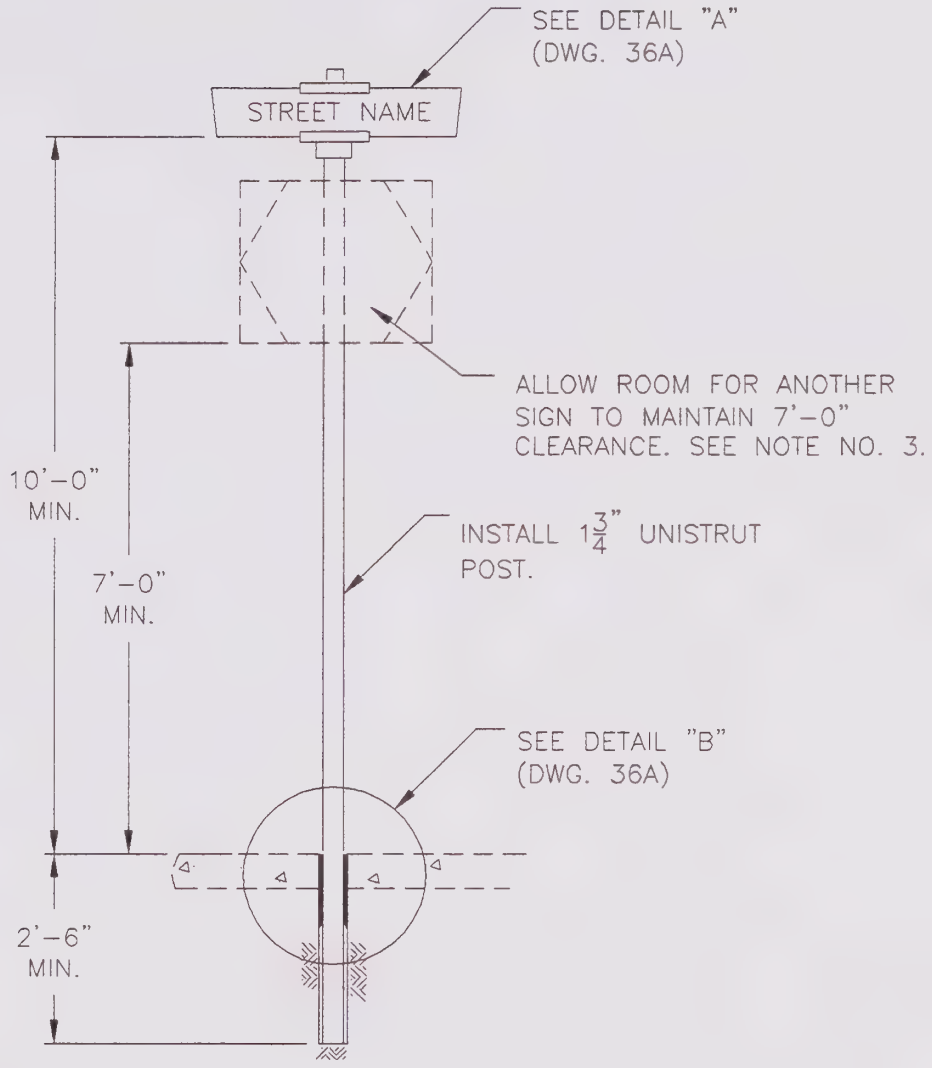
DWG. BY	RC	SCALE
CK. BY		NONE

BARRICADE FOR TERMINATING STREETS

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 01/09/02

SUPERCEDES DWG. DATED	DRAWING NO.
2/23/95	35B

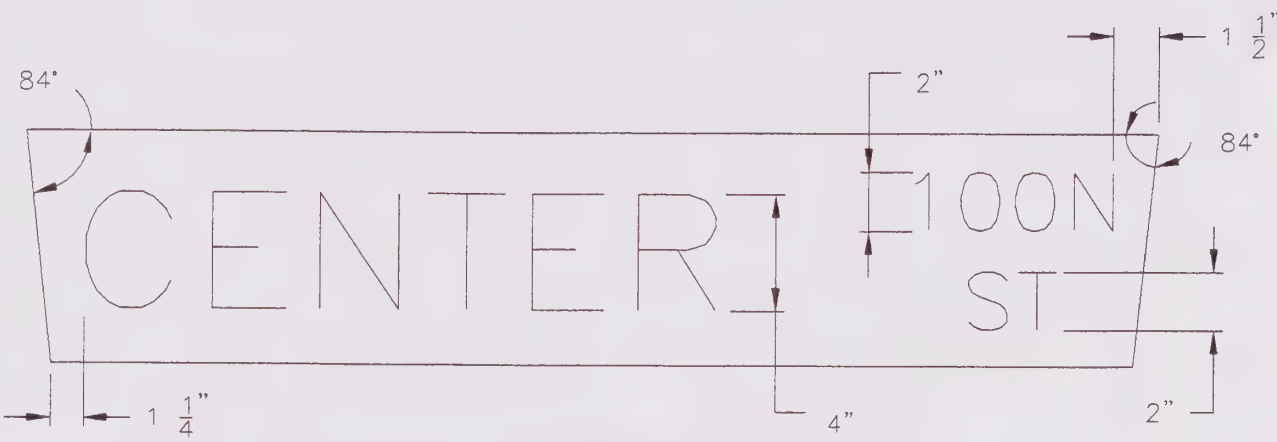


NOTES:

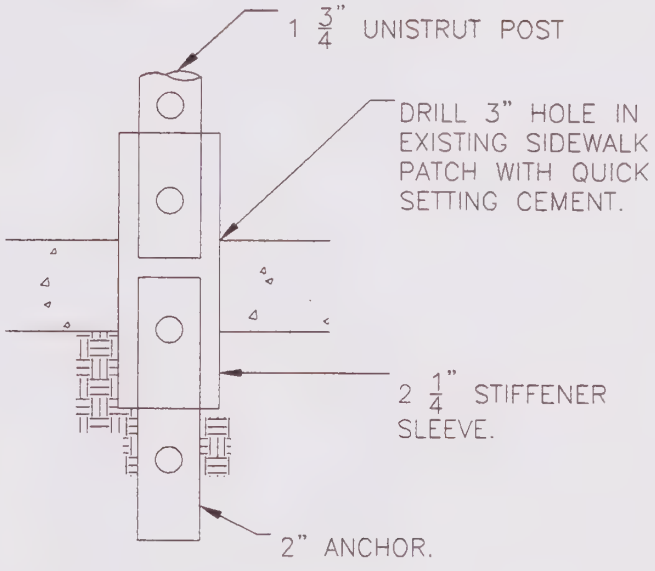
1. CONTACT TRAFFIC DEVICES SECTION 48 HOURS PRIOR TO POURING. CITY WILL SUPPLY COUPLING AND EXTENSION TO CONTRACTOR. CITY WILL DETERMINE SIGN LOCATION IN FIELD. CALL 937–7408.
2. COUPLING TO BE PLUMBED AND LEVELED TO SIDEWALK GRADE.
3. IF ADDITIONAL SIGNS ARE APPROVED OR REQUIRED BY THE CITY TRAFFIC ENGINEER, THE INSTALLATION SHALL MEET OTHER REGULATIONS REQUIRED UNDER CHAPTER 4 OF CALTRANS TRAFFIC MANUAL.
4. FOR INSTALLATION NOTES SEE DRAWING 36B.
5. ALL LETTERS ARE UPPER CASE, HIGHWAY "C" SERIES FONT.

REV. NO.	REV. DATE	REV. BY	STREET NAME AND TRAFFIC SIGN INSTALLATION DETAIL	NEW DRAWING APPROVED BY CITY ENGINEER Finbar J. O'Regan DATE: 01/09/02	
2	6/1/2000	HLE/RH			
DIGITIZED	10/7/93				
DWG. BY	SA	SCALE	CITY OF STOCKTON DEPARTMENT OF PUBLIC WORKS	SUPERCEDES DWG. DATED 6/1/94	DRAWING NO. 36
CK. BY		NONE			

(CONT'D FROM DWG. 36)



DETAIL A



DETAIL B $1\frac{3}{4}$" UNISTRUT POST

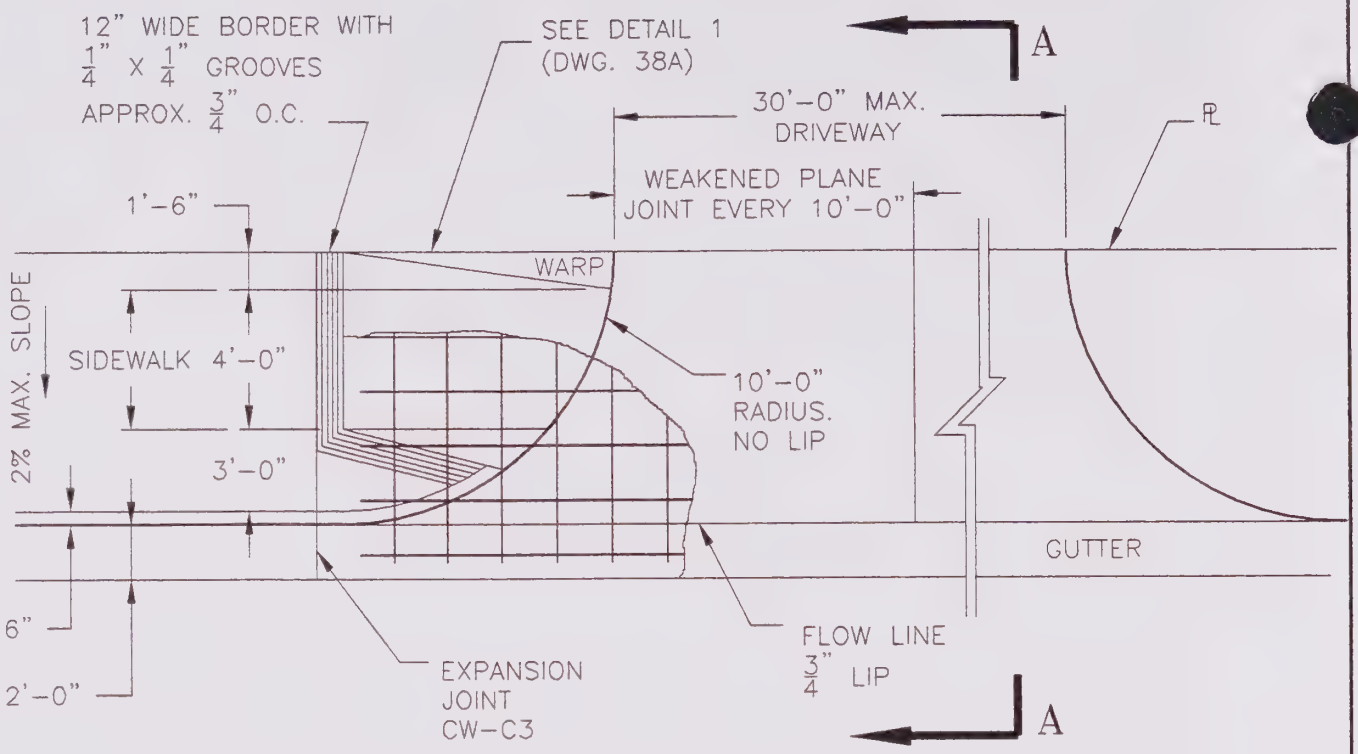
REV. NO.	REV. DATE	REV. BY	STREET NAME AND TRAFFIC SIGN INSTALLATION DETAIL	NEW DRAWING APPROVED BY CITY ENGINEER Finbarr J. O'Regan DATE: 01/09/02	
2	6/1/2000	HLE/RH			
DIGITIZED	10/7/93				
DWG. BY SA	SCALE		CITY OF STOCKTON DEPARTMENT OF PUBLIC WORKS	SUPERCEDES DWG. DATED 6/1/94	DRAWING NO. 36A
CK. BY	NONE				

(CONT'D FROM DWG. 36A)

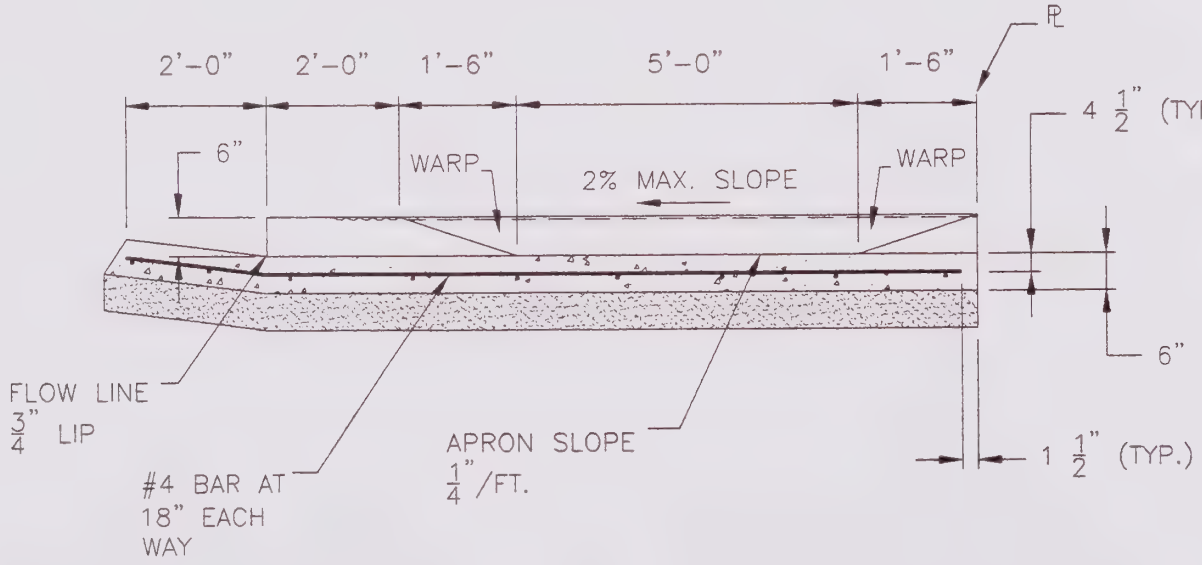
NOTES:

1. DRILL 3" HOLE IN CONCRETE IF SIGN IS INSTALLED AFTER SIDEWALK IS CONSTRUCTED. INSTALL 2 1/4" PERFORATED SQUARE PIPE STIFFENER SLEEVE WITH 1 3/4" PERFORATED SQUARE PIPE ANCHOR SECTION 30" BELOW SIDEWALK GRADE. PATCH SIDEWALK WITH QUICK SETTING CEMENT (ALL PERFORATED SQUARE PIPE SHALL BE TELSPAR. 14 GAUGE, GALVANIZED STEEL OR EQUAL).
2. WHEN INSTALLED BEFORE SIDEWALK IS CONSTRUCTED, DRIVE 2 1/4" SQUARE PIPE STIFFENER SLEEVE AND 2" PERFORATED SQUARE PIPE 30" INTO EXISTING GROUND SURFACE. SET TOP OF STIFFENER SLEEVE MINIMUM OF 2 FULL PERFORATION HOLES ABOVE ULTIMATE SIDEWALK GRADE. CAP END TO PREVENT CONCRETE FROM ENTERING PIPE DURING SIDEWALK CONSTRUCTION.
3. TWO (2) 3/8" DRIVE RIVETS, PERPENDICULAR TO EACH OTHER, SHALL BE USED TO INSTALL 1 3/4" PERFORATED SQUARE PIPE TO STIFFENER SLEEVE. TWO (2) 3/8" DRIVE RIVETS SHALL BE USED TO INSTALL ALL SIGNS OTHER THAN STREET NAME SIGNS TO SQUARE SIGN PIPE.
4. SIGN LOCATION SHALL BE ON N.E. CORNER ONLY, FOR RESIDENTIAL STREETS. SIGNS SHALL BE INSTALLED ON N.E. AND S.W. CORNERS FOR INTERSECTION OF MAJOR ARTERIAL WITH COLLECTOR OR RESIDENTIAL STREETS. INSTALL STREET NAME SIGN ON STREET LIGHTING STANDARD WHERE APPLICABLE. BRACKET SHALL BE HAWKINS, WING BRACKET, PART NO. V14F-(HD)SL-AB-0.125 OR EQUAL.
5. CITY STAFF SHALL RETAIN AUTHORITY FOR ULTIMATE LOCATION OF SIGNS. NOTIFY TRAFFIC DEVICES SIGN SHOP AT 937-7408 A MINIMUM OF 48 HOURS PRIOR TO INSTALLATION FOR LOCATION VERIFICATION.
6. ALL SIGNS SHALL BE INSTALLED AS CLOSE TO BACK OF WALK AS POSSIBLE TO RETAIN A MINIMUM OF 3'-6" CLEARANCE FOR WHEELCHAIR ACCESS.
7. STREET NAME SIGNS SHALL BE DOUBLE FACED ALUMINUM BLANKS (0.125" THICKNESS). WHITE LEGENDS ON GREEN BACKGROUND. ALL GREEN BACKGROUND VINYL SHEETING SHALL BE REFLECTIVE 3M, ENGINEER'S GRADE. WHITE LEGENDS SHALL BE NON-REFLECTIVE 3M VINYL SHEETING. LETTERING SHALL BE AS ILLUSTRATED IN DETAIL A, STD. DWG. NO. 36A. ALL SIGNS SHALL BE APPROVED FOR CONFORMANCE TO CITY STANDARDS BY CITY TRAFFIC DEVICES STAFF PRIOR TO INSTALLATION.
8. SQUARE PIPE TOP SIGN BRACKET SHALL BE HAWKINS, PART NUMBER V14F-(HD)SL-107(2C)-0.125 OR EQUAL. CROSSPIECE SIGN BRACKET SHALL BE 90°, HAWKINS PART NUMBER V14F-(HD)SL-105(90)-0.125 OR EQUAL.
9. ALL STREET SIGNS THAT WILL BE INSTALLED PER DRAWING 36 SHALL HAVE AN ANTI-GRAFFITI FILM. USE A 3M SERIES 1150 PS PROTECTIVE FILM OR NIKKALITE SCAL TRANSPARENT PS PROTECTIVE FILM OR APPROVED EQUAL.

REV. NO.	REV. DATE	REV. BY	STREET NAME AND TRAFFIC SIGN INSTALLATION NOTES	NEW DRAWING APPROVED BY CITY ENGINEER Finbar J. O'Regan DATE: 01/09/02	
2	6/1/2000	HLE/RH			
DIGITIZED	12/29/93				
DWG. BY	SA	SCALE	CITY OF STOCKTON DEPARTMENT OF PUBLIC WORKS	SUPERCEDES DWG. DATED 6/1/94	DRAWING NO. 36B
CK. BY		NONE			



PLAN VIEW



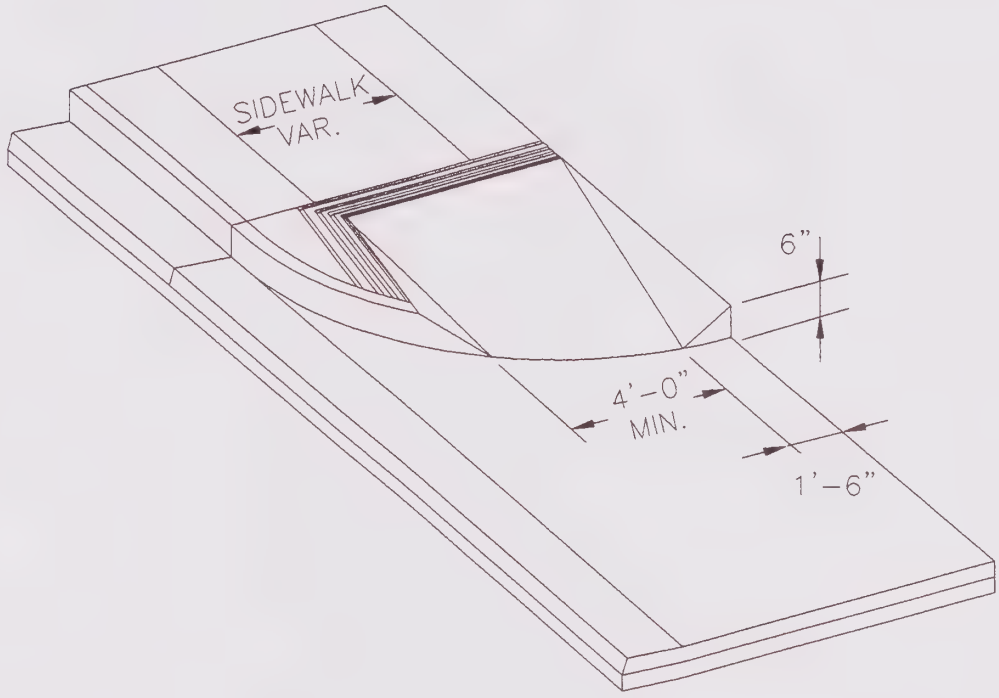
SECTION A-A

NOTES:

1. WHEELCHAIR RAMP HEAVY BROOM FINISH WITH THE SLOPE OF THE RAMP.
2. ALSO SEE COMMERCIAL RAMP DRIVEWAY DWG. 27.
3. SEE ISOMETRIC VIEW ON DRAWING 38A.
4. DRIVEWAYS OVER 30'-0" SHALL BE APPROVED BY THE CITY ENGINEER.

REV. NO.	REV. DATE	REV. BY	STANDARD COMMERCIAL DRIVEWAY	NEW DRAWING APPROVED BY CITY ENGINEER
4	6/1/2003	HL/EA		Finbar J. O'Kegan
DIGITIZED	7/1/91			DATE: 11/25/03
DWG. BY RC	SCALE		CITY OF STOCKTON	SUPERCEDES DWG. DATED
CK. BY	NONE		DEPARTMENT OF PUBLIC WORKS	01/09/02
				DRAWING NO. 38

(CONT'D FROM DWG. 38)



DETAIL 1

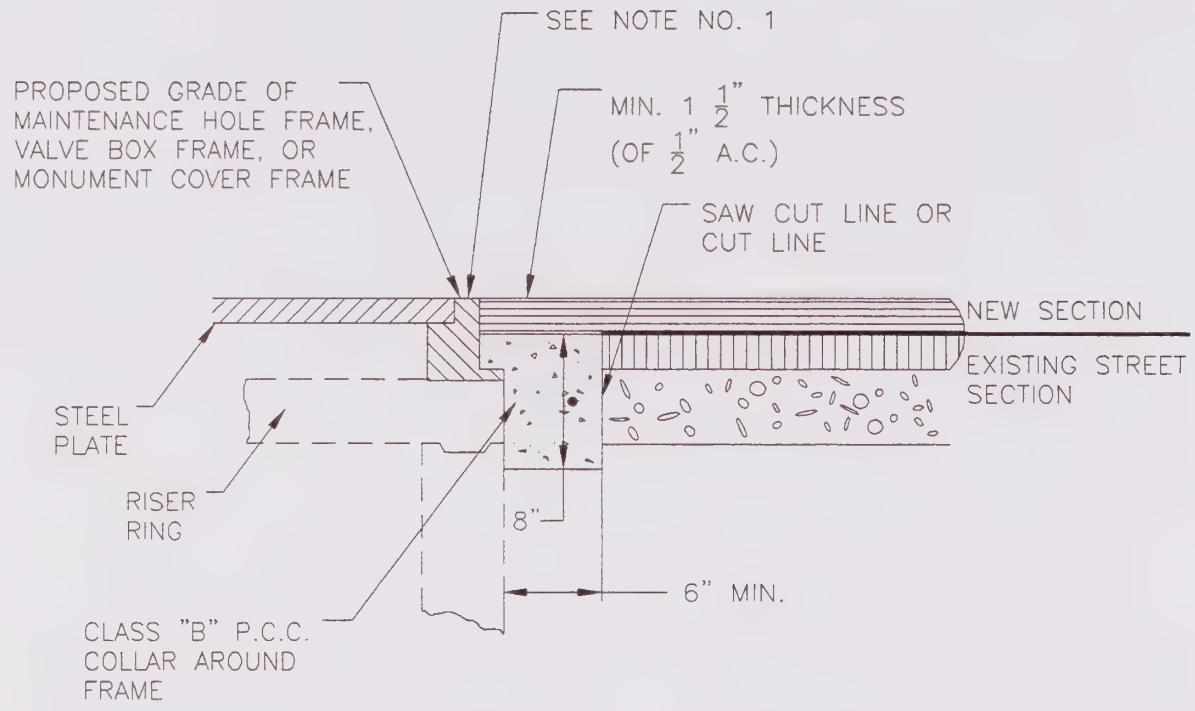
REV. NO.	REV. DATE	REV. BY
	6/1/2003	HL/EA
DIGITIZED		
DWG. BY HLE	SCALE	
CK. BY	NONE	

STANDARD COMMERCIAL DRIVEWAY

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

NEW DRAWING APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 11/25/03

SUPERCEDES DWG. DATED	DRAWING NO.
01/09/02	38A

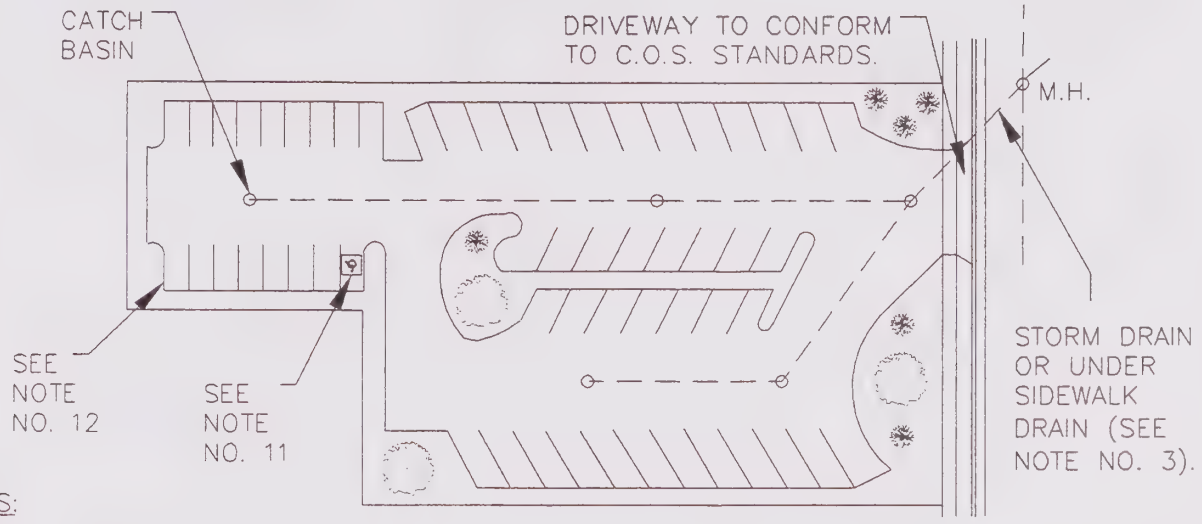


ADJUSTING EXISTING FRAMES

NOTES:

1. ELEVATION OF FRAME SHALL MATCH FINISH GRADE OF ADJACENT PAVEMENT ± 1/8".

REV. NO.	REV. DATE	REV. BY	ADJUSTING STREET FACILITIES TO GRADE	REVISION APPROVED BY CITY ENGINEER
3	6/1/2000	HLE/RH		Finbar J. O'Regan
DIGITIZED	1/1/92			DATE: 01/09/02
DWG. BY RC	SCALE		CITY OF STOCKTON	SUPERCEDES DWG. DATED 2/23/95
CK. BY	NONE		DEPARTMENT OF PUBLIC WORKS	DRAWING NO. 39



NOTES:

1. THE STANDARD PAVED SURFACE FOR PARKING LOTS, INCLUDING FIRE DEPARTMENT REQUIRED CIRCULATION SHALL BE ASPHALT OR CONCRETE WITH A STANDARD SECTION BASED ON A MINIMUM TI = 4 AND AN R = 5. OTHER ALTERNATIVES OF DUST AND TRACK FREE MATERIALS MAY BE SUBMITTED FOR CITY ENGINEER/FIRE DEPARTMENT APPROVAL. SAND, DECOMPOSED GRANITE, GRAVEL AND/OR SIMILAR TYPE MATERIAL ARE NOT ACCEPTABLE.
2. PARKING LOTS WHICH WILL EXPERIENCE TRUCK TRAFFIC MAY REQUIRE HIGHER T.I. VALUES AND SHALL BE DESIGNED ACCORDINGLY.
3. UNDER SIDEWALK DRAINS ALLOWED FOR PARCELS UP TO ONE ACRE IN SIZE (SEE STANDARD DRAWING NO. 81). LARGER PARCELS MUST CONNECT TO A STORM SEWER AT A CATCH BASIN OR MAINTENANCE HOLE.
4. A MINIMUM CROSS SLOPE OF 1% IS REQUIRED.
* 5. THE MINIMUM NUMBER OF PARKING SPACES REQUIRED SHALL CONFORM TO CHAPTER 16 OF THE STOCKTON MUNICIPAL CODE.
* 6. PARKING LAYOUT AND DESIGN SHALL BE IN CONFORMANCE WITH "PARKING LOT DEVELOPMENT STANDARDS" ESTABLISHED BY THE COMMUNITY DEVELOPMENT DEPARTMENT OF THE CITY OF STOCKTON AND STANDARD PLAN NO. 40A AND NOS. 41 THROUGH 41H.
* 7. ANY PARKING LAYOUT NECESSITATING A CUL-DE-SAC OR SIMILAR TURNING FACILITY FOR REVERSING THE DIRECTION OF TRAVEL IN ORDER TO EXIT FROM THE AREA OR ANY PARKING SPACES WILL GENERALLY BE DISCOURAGED, AND IT SHOULD BE ACCEPTED BY CITY STAFF PRIOR TO INCORPORATION INTO THE PLAN.
* 8. IN ALL PARKING LOT DESIGN, PROVISIONS SHALL BE MADE FOR THE MANEUVERING OF EMERGENCY VEHICLES, AND THE ARRANGEMENT SHALL BE ACCEPTED BY CITY STAFF PRIOR TO INCORPORATION INTO THE PLAN.
* 9. PARKING OR BACKING AREA WITHIN A PARKING LOT SHALL NOT EXTEND INTO THE PUBLIC RIGHT-OF-WAY EXCEPT AS PROVIDED IN THE STOCKTON MUNICIPAL CODE.
10. ALL UNUSABLE AREAS SHALL BE LANDSCAPED WHERE PRACTICAL.
11. END STALLS SHOULD BE PROTECTED FROM THE TURNING MOVEMENTS OF OTHER VEHICLES.

* *DEVIATION FROM THESE SECTIONS REQUIRES PLANNING COMMISSION APPROVAL*

REV. NO.	REV. DATE	REV. BY
4	6/1/2000	HLE/RH
DIGITIZED	7/1/90	
DWG. BY	RC	SCALE
CK. BY		NONE

PARKING AREA STANDARDS

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 01/09/02

SUPERCEDES DWG. DATED 2/23/95

DRAWING NO. 40

(CONT'D FROM DWG. 40)

12. CONTINUOUS CONCRETE CURBING SHALL BE USED AS WHEEL STOPS WHEREVER POSSIBLE. THE USE OF BUMPER BLOCKS IS DISCOURAGED.
13. HANDICAPPED STALLS SHALL COMPLY WITH THE STATE BUILDING CODE AND CITY OF STOCKTON STANDARD PLANS AND SPECIFICATIONS.
14. DEAD-END 90° PARKING SHALL BE PROVIDED WITH ADEQUATE TURNING ROOM.
15. IN LOCATIONS WHERE PARALLEL PARKING IS PERMITTED OR POSSIBLE, AN ADDITIONAL 3'-0" SHALL BE ADDED TO THE AISLE WIDTH TO ACCOMMODATE PARKED VEHICLES ON ONE SIDE OR AN ADDITIONAL 11'-0" SHALL BE ADDED TO THE AISLE WIDTH TO ACCOMMODATE PARKED VEHICLES ON BOTH SIDES (i.e., PARKING ON ONE SIDE 28'-0", ON BOTH SIDES 36'-0"). PARALLEL PARKING IS CONSIDERED POSSIBLE WHEREVER 20'-0" OR MORE OF CLEAR, REASONABLY STRAIGHT CURB EXISTS.
* 16. THE FOLLOWING ARE THE MINIMUM ACCEPTABLE DIMENSION FOR INDIVIDUAL PARKING SPACES:
    A) MINIMUM STANDARD PARKING SPACE - 8'-6" WIDE BY 19'-0" LONG (SEE STRIPING REQUIREMENTS - NO. 17).
    B) MINIMUM COMPACT PARKING SPACE - 7'-6" WIDE BY 15'-0" LONG (SEE STRIPING REQUIREMENTS - NO. 17). 25% OF THE REQUIRED OFF STREET PARKING MAY BE DEVELOPED TO COMPACT SIZE.
    C) SPACES WITHIN GARAGES AND CARPORTS - 9'-0" WIDE BY 19'-0" LONG.
* 17. PARKING SPACES MUST BE DEVELOPED WITH DRAINAGE AND SURFACING AS REQUIRED IN THE CITY OF STOCKTON STANDARD SPECIFICATIONS AND PLANS (SEE DRAWING NO. 40). PARKING SPACE SURFACES SHALL BE STRIPED TO CLEARLY DEFINE EACH PARKING SPACE. IN ADDITION, PARKING LOTS PROVIDING STANDARD SIZE PARKING SPACES THAT ARE LESS THAN 9'-0" WIDE BY 19'-0" LONG (8'-6" BY 19'-0" MIN.) MUST BE DOUBLE STRIPED, WHEREAS PARKING SPACES THAT ARE AT LEAST 9'-0" WIDE BY 19'-0" LONG MAY BE SINGLE STRIPED. COMPACT PARKING SPACES CAN BE SINGLE STRIPED. PARKING SPACE WIDTHS ARE MEASURED ON CENTER. SEE DRAWINGS 41B AND 41C FOR STRIPING DETAILS.
* 18. ALL PARKING LOTS WITH MORE THAN 4 SPACES SHALL CONFORM TO LANDSCAPING AND SCREENING REQUIREMENTS OF THE STOCKTON MUNICIPAL CODE FOR THE "DEVELOPMENT STANDARD FOR OFF-STREET PARKING."
* 19. CIRCULATION REQUIRING USE OF A PUBLIC STREET TO TRAVEL FROM AISLE TO AISLE IN SEARCH OF A PARKING SPACE IS NOT PERMITTED.

* DEVIATION FROM THESE SECTIONS REQUIRES PLANNING COMMISSION APPROVAL

REV. NO.	REV. DATE	REV. BY
1	6/1/2000	HLE/RH

DIGITIZED 3/17/95

DWG. BY PLANNING | SCALE

CK. BY | NONE

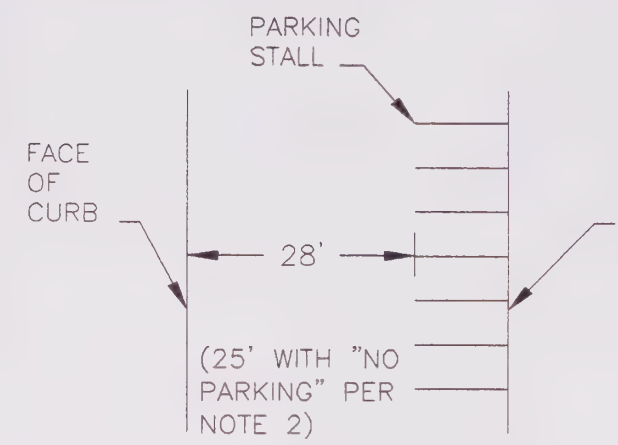
ADDITIONAL PARKING AREA STANDARDS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Rega
DATE: 01/09/02

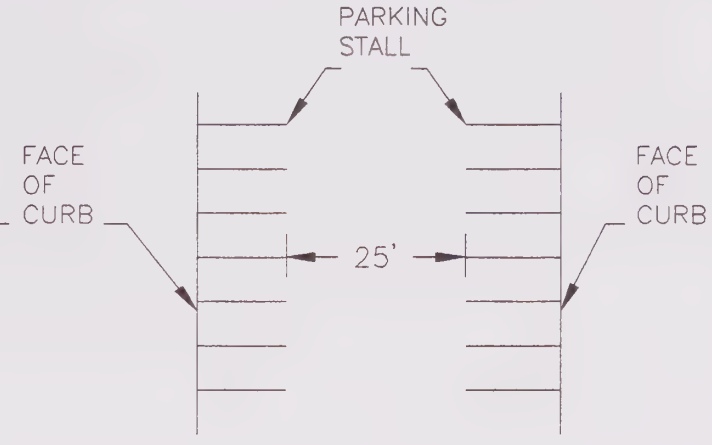
CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

SUPERCEDES DWG. DATED 3/17/95

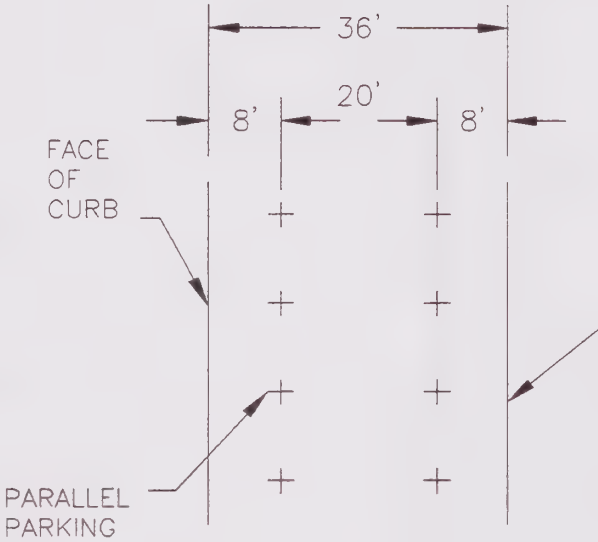
DRAWING NO. 40A



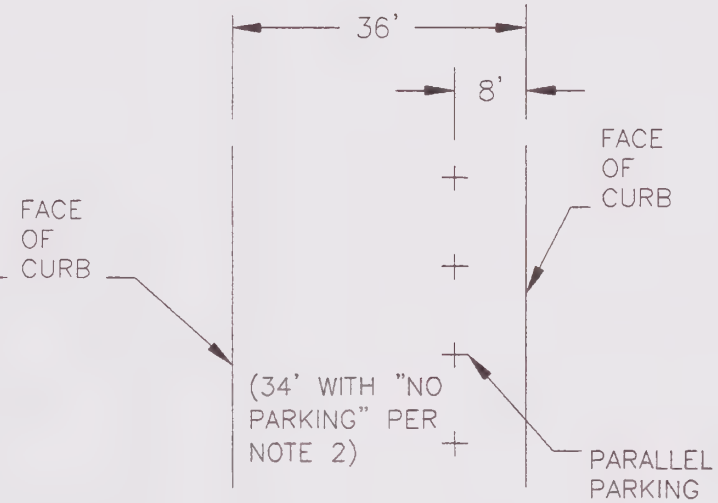
CASE "A"



CASE "B"



CASE "C"



CASE "D"

NOTES:

1. THE ABOVE MINIMUM WIDTHS SHOWN ARE REQUIRED FOR OFF-STREET PARKING AREAS IN CONNECTION WITH BUILDING DEVELOPMENTS.

2. WHEN ANY PORTION OF A STRUCTURE IS MORE THAN 150'-0" FROM A PUBLIC STREET. THE ABOVE WIDTHS MAY BE REDUCED WITH THE APPROVAL OF THE FIRE DEPARTMENT AND THE PUBLIC WORKS DEPARTMENT. ANY SUCH REDUCTIONS WILL REQUIRE THE ESTABLISHMENT OF APPROPRIATE "NO PARKING" ZONES TOGETHER WITH THE INSTALLATION OF "NO PARKING" SIGNS BY THE DEVELOPER AS SHOWN ON DRAWING NO. 41A.

3. ALL PARKING AREA CONSTRUCTION SHALL BE PERFORMED IN ACCORDANCE WITH STANDARD DRAWING NO. 40.

REV. NO.	REV. DATE	REV. BY
1	6/1/2000	HLE/RH
DIGITIZED	1/1/92	
DWG. BY	RC	SCALE
CK. BY		NONE

AISLE WIDTH REQUIREMENTS FOR PARKING AREAS

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

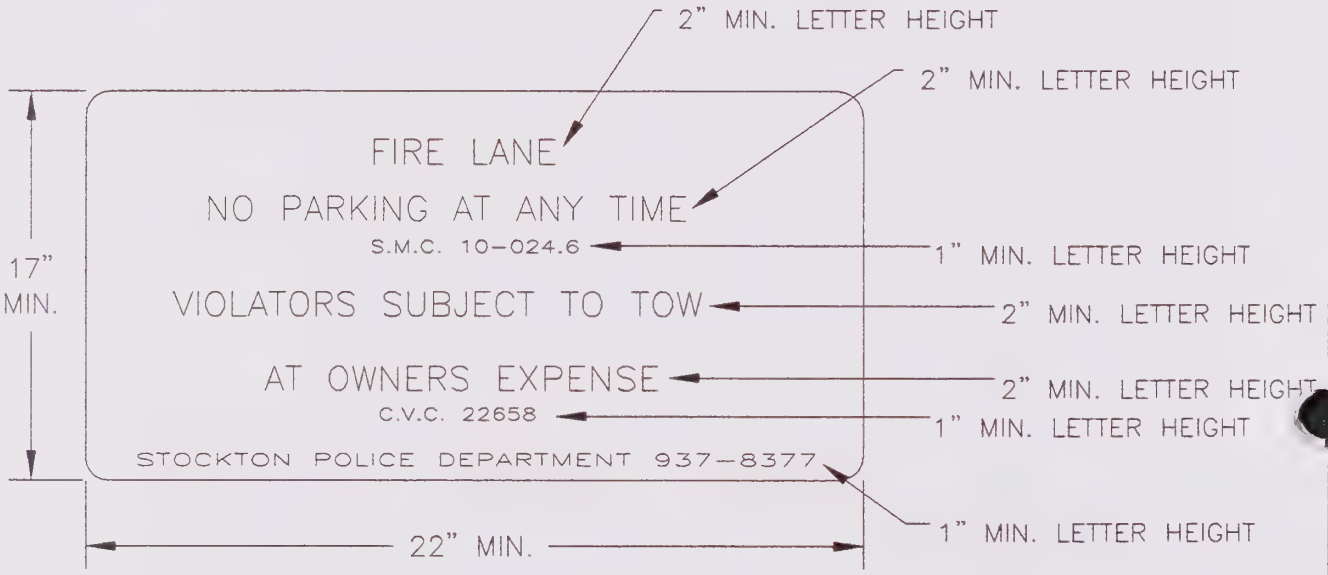
REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 01/09/02

SUPERCEDES DWG. DATED 1/1/92

DRAWING NO. 41

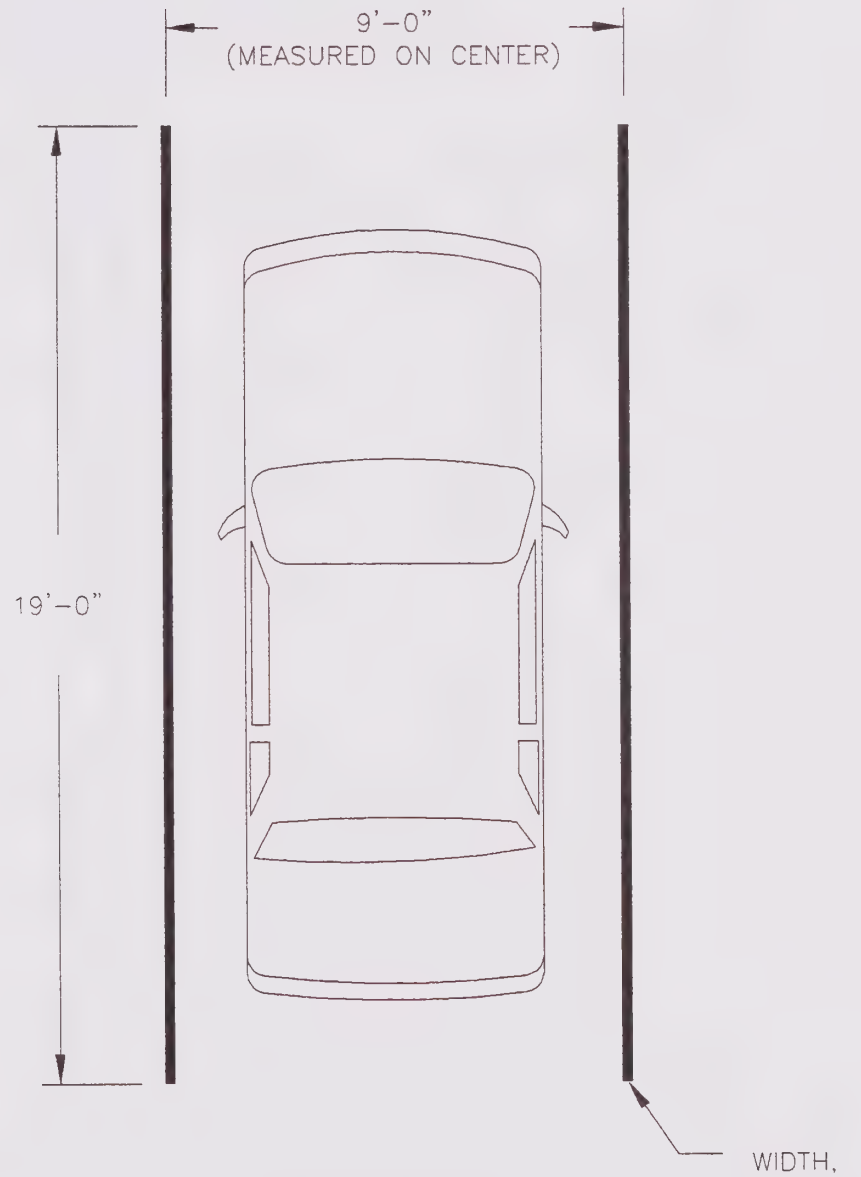
FIRE LANE SIGNING

1. FIRE LANE SIGNS AS DESIGNATED BY THE CITY OF STOCKTON SHALL BE APPROVED BY THE CITY FIRE DEPARTMENT PRIOR TO INSTALLATION.
2. SIGNS SHALL BE ALL WEATHER CONSTRUCTION WITH RED LETTERS ON WHITE BACKGROUND.
3. SIGNS SHALL READ AS FOLLOWS:



REV. NO.	REV. DATE	REV. BY	FIRE LANE SIGNING	REVISION APPROVED BY CITY ENGINEER
2	6/4/94	KB		Finbar J. O'Regan
DIGITIZED	1/1/92			DATE: 01/09/02
DWG. BY RC	SCALE		CITY OF STOCKTON	SUPERCEDES DWG. DATED 7/1/84
CK. BY	NONE		DEPARTMENT OF PUBLIC WORKS	DRAWING NO. 41A

TYPICAL 9' BY 19' PARKING STALL – SINGLE STRIPED



DRIVEWAY AISLE

REV. NO.	REV. DATE	REV. BY
1	6/1/2000	HLE/RH
DIGITIZED	3/17/95	
DWG. BY PLANNING	SCALE	
CK. BY	NONE	

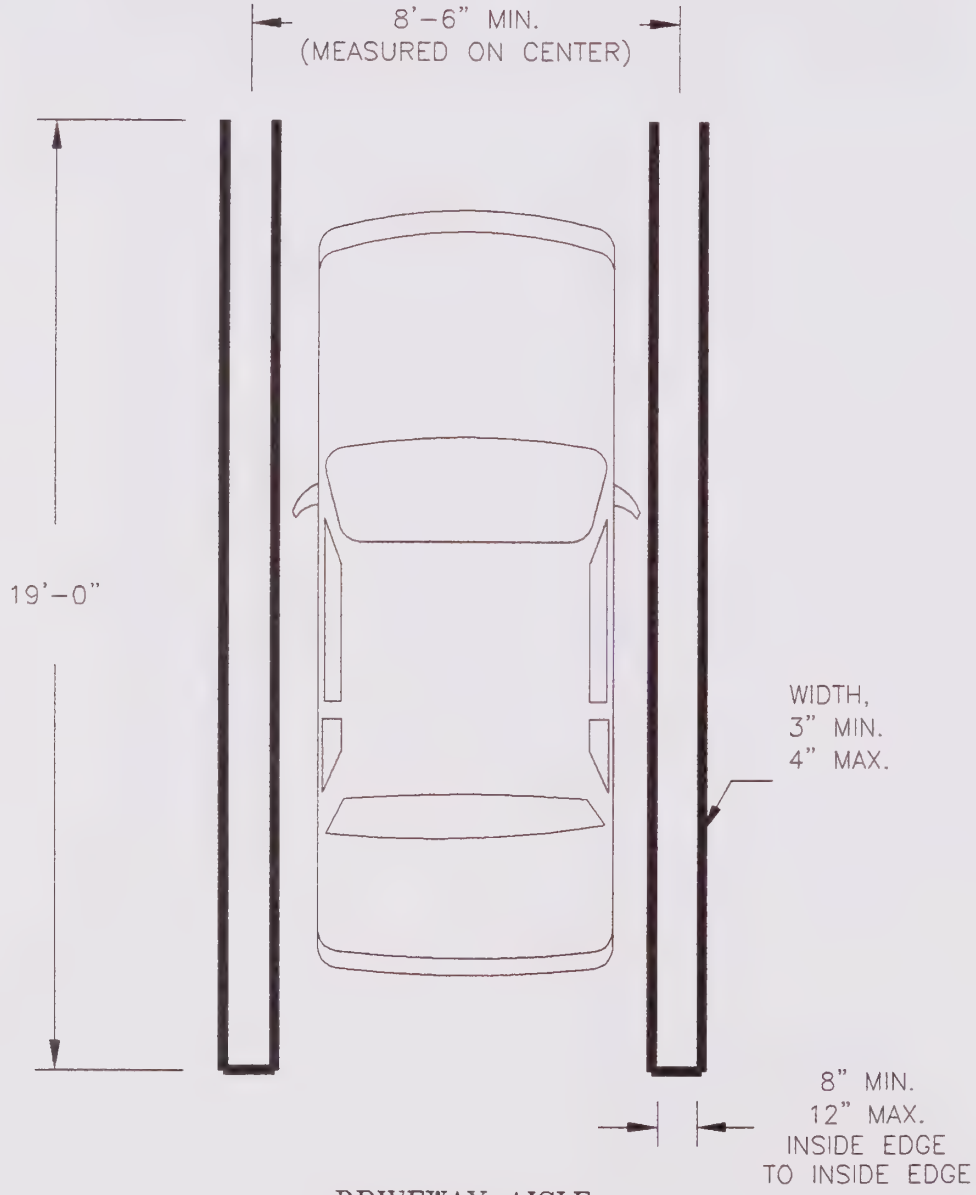
TYPICAL 9' BY 19' PARKING STALL
SINGLE STRIPED

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

DEVIATIONS FROM THIS DRAWING REQUIRE PLANNING COMMISSION APPROVAL
Finbar J. O'Regan
DATE: 01/09/02

SUPERCEDES DWG. DATED	DRAWING NO.
3/17/95	41B

STANDARD PARKING STALL – DOUBLE STRIPED



DRIVEWAY AISLE

REV. NO.	REV. DATE	REV. BY
1	6/1/2000	HLE/RH
DIGITIZED	3/17/95	
DWG. BY PLANNING	SCALE	
CK. BY	NONE	

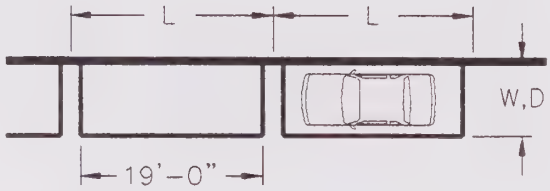
STANDARD PARKING STALL
DOUBLE STRIPED

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

DEVIATIONS FROM THIS DRAWING REQUIRE PLANNING COMMISSION APPROVAL
Finbar J. O'Regan
DATE: 01/09/02

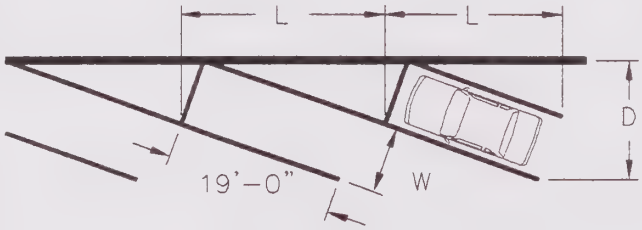
SUPERCEDES DWG. DATED	DRAWING NO.
3/17/95	41C

STANDARD PARKING DIMENSIONS

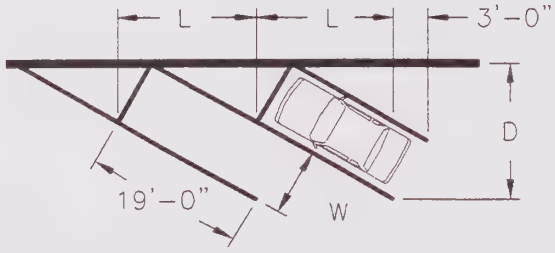


THE PARALLEL DESIGN IS FOR ON-STREET PARKING AND IS NOT GENERALLY ACCEPTABLE WITHIN PARKING LOTS.

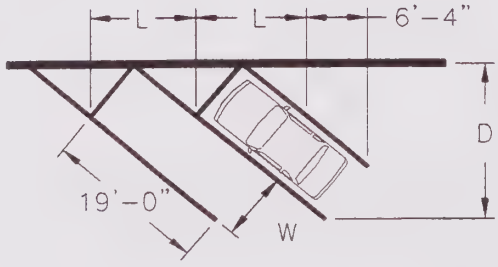
PARK ANGLE	STALL WIDTH (W)	CURB LENGTH PER CAR (L)	STALL DEPTH (D)	MIN. AISLE WIDTH
0°	8'-6"	23'-0"	8'-6"	12'-0"
	9'-0"	23'-0"	9'-0"	12'-0"
	9'-6"	23'-0"	9'-6"	12'-0"



PARK ANGLE	STALL WIDTH (W)	CURB LENGTH PER CAR (L)	STALL DEPTH (D)	MIN. AISLE WIDTH
20°	8'-6"	24'-11"	14'-6"	11'-0"
	9'-0"	26'-4"	15'-0"	11'-0"
	9'-6"	27'-10"	15'-6"	11'-0"



PARK ANGLE	STALL WIDTH (W)	CURB LENGTH PER CAR (L)	STALL DEPTH (D)	MIN. AISLE WIDTH
30°	8'-6"	17'-0"	16'-11"	11'-0"
	9'-0"	18'-0"	17'-4"	11'-0"
	9'-6"	19'-0"	17'-10"	11'-0"



PARK ANGLE	STALL WIDTH (W)	CURB LENGTH PER CAR (L)	STALL DEPTH (D)	MIN. AISLE WIDTH
40°	8'-6"	13'-4"	18'-10"	12'-0"
	9'-0"	14'-0"	19'-2"	12'-0"
	9'-6"	14'-10"	19'-6"	12'-0"

REV. NO.	REV. DATE	REV. BY
1	6/1/2000	HLE/RH
DIGITIZED	3/17/95	
DWG. BY PLANNING	SCALE	
CK. BY	NONE	

STANDARD PARKING STALL DIMENSIONS

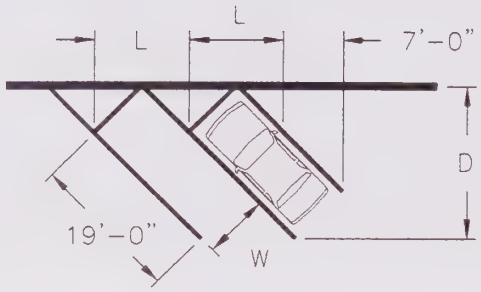
CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

DEVIATIONS FROM THIS DRAWING REQUIRE PLANNING COMMISSION APPROVAL
Finbar J. O'Regan
DATE: 01/09/02

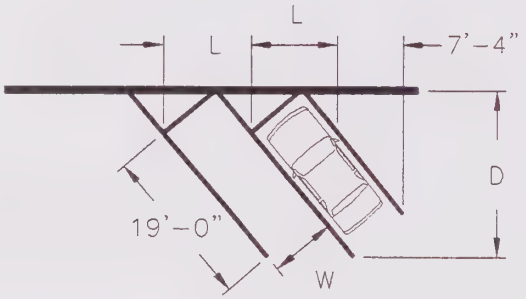
SUPERCEDES DWG. DATED 3/17/95

DRAWING NO. 41D

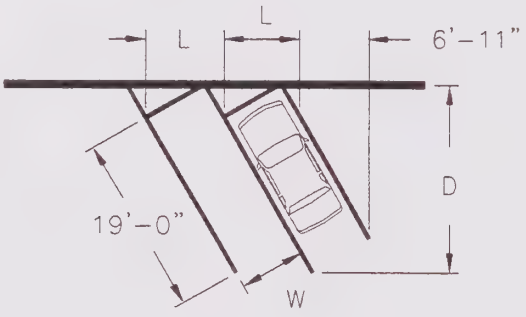
STANDARD PARKING DIMENSIONS



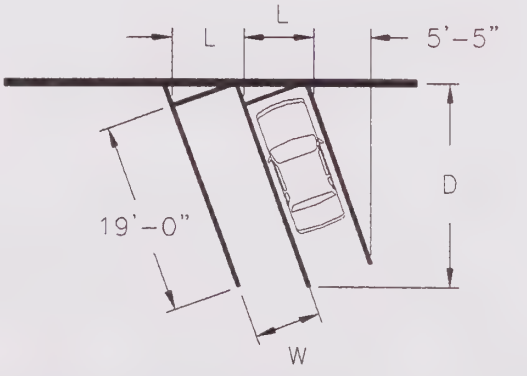
PARK ANGLE	STALL WIDTH (W)	CURB LENGTH PER CAR (L)	STALL DEPTH (D)	MIN. AISLE WIDTH
45°	8'-6"	12'-0"	19'-5"	13'-6"
	9'-0"	12'-10"	19'-11"	13'-6"
	9'-6"	13'-5"	20'-2"	13'-6"



PARK ANGLE	STALL WIDTH (W)	CURB LENGTH PER CAR (L)	STALL DEPTH (D)	MIN. AISLE WIDTH
50°	8'-6"	11'-2"	20'-0"	15'-0"
	9'-0"	11'-10"	20'-5"	15'-0"
	9'-6"	12-5"	20'-10"	15'-0"



PARK ANGLE	STALL WIDTH (W)	CURB LENGTH PER CAR (L)	STALL DEPTH (D)	MIN. AISLE WIDTH
60°	8'-6"	9'-10"	20'-10"	18'-6"
	9'-0"	10'-5"	21'-0"	18'-6"
	9'-6"	11'-0"	21'-4"	18'-6"



PARK ANGLE	STALL WIDTH (W)	CURB LENGTH PER CAR (L)	STALL DEPTH (D)	MIN. AISLE WIDTH
70°	8'-6"	9'-0"	20'-10"	19'-6"
	9'-0"	9'-8"	21'-0"	19'-6"
	9'-6"	10'-2"	21'-4"	19'-6"

REV. NO.	REV. DATE	REV. BY
1	6/1/2000	HLE/RH

DIGITIZED 3/17/95

DWG. BY PLANNING | SCALE

CK. BY | NONE

STANDARD PARKING
STALL DIMENSIONS

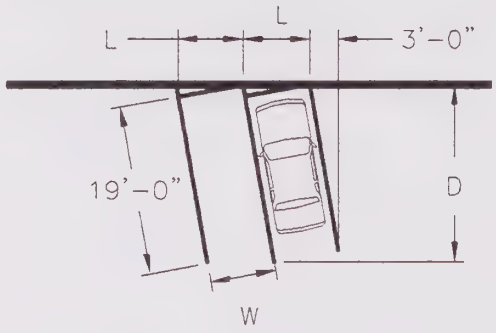
CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

DEVIATIONS FROM THIS DRAWING REQUIRE PLANNING COMMISSION APPROVAL
Finbar J. O'Reg
DATE: 01/09/02

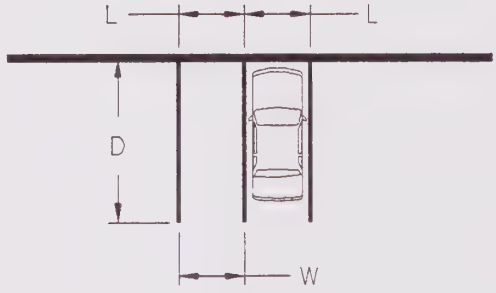
SUPERCEDES DWG. DATED 3/17/95

DRAWING NO. 41E

STANDARD PARKING DIMENSIONS



PARK ANGLE	STALL WIDTH (W)	CURB LENGTH PER CAR (L)	STALL DEPTH (D)	MIN. AISLE WIDTH
80°	8'-6"	8'-8"	20'-4"	24'-0"
	9'-0"	9'-2"	20'-4"	24'-0"
	9'-6"	9'-8"	20'-5"	24'-0"



PARK ANGLE	STALL WIDTH (W)	CURB LENGTH PER CAR (L)	STALL DEPTH (D)	MIN. AISLE WIDTH
90°	8'-6"	8'-6"	19'-0"	25'-0"
	9'-0"	9'-0"	19'-0"	25'-0"
	9'-6"	9'-6"	19'-0"	25'-0"

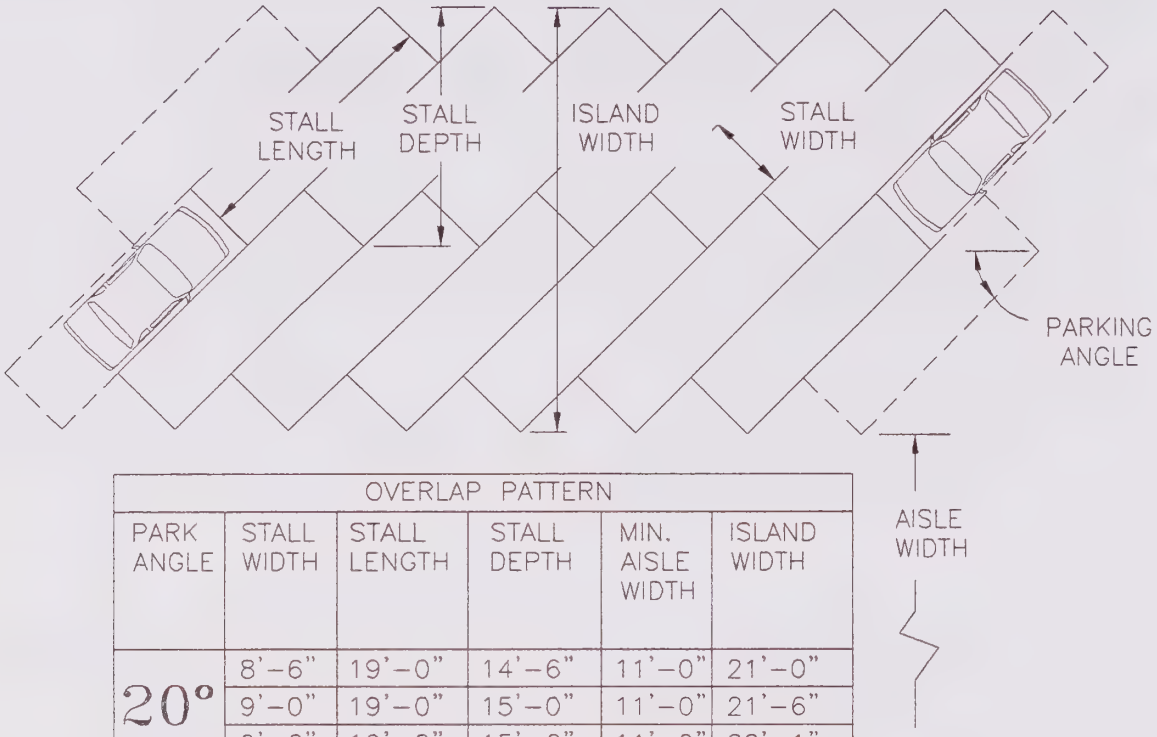
REV. NO.	REV. DATE	REV. BY
1	6/1/2000	HLE/RH
DIGITIZED	3/17/95	
DWG. BY PLANNING	SCALE	
CK. BY	NONE	

STANDARD PARKING
STALL DIMENSIONS

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

DEVIATIONS FROM THIS DRAWING REQUIRE PLANNING COMMISSION APPROVAL
Finbar J. O'Regan
DATE: 01/09/02

SUPERCEDES DWG. DATED	DRAWING NO.
3/17/95	41F



OVERLAP PATTERN					
PARK ANGLE	STALL WIDTH	STALL LENGTH	STALL DEPTH	MIN. AISLE WIDTH	ISLAND WIDTH
20°	8'-6"	19'-0"	14'-6"	11'-0"	21'-0"
	9'-0"	19'-0"	15'-0"	11'-0"	21'-6"
	9'-6"	19'-0"	15'-6"	11'-0"	22'-1"
30°	8'-6"	19'-0"	16'-11"	11'-0"	26'-5"
	9'-0"	19'-0"	17'-4"	11'-0"	26'-10"
	9'-6"	19'-0"	17'-10"	11'-0"	27'-5"
40°	8'-6"	19'-0"	18'-8"	12'-0"	30'-11"
	9'-0"	19'-0"	19'-2"	12'-0"	31'-4"
	9'-6"	19'-0"	19'-6"	12'-0"	31'-8"
45°	8'-6"	19'-0"	19'-5"	13'-6"	32'-10"
	9'-0"	19'-0"	19'-11"	13'-6"	33'-2"
	9'-6"	19'-0"	20'-2"	13'-6"	33'-6"
50°	8'-6"	19'-0"	20'-0"	15'-0"	34'-6"
	9'-0"	19'-0"	20'-5"	15'-0"	35'-0"
	9'-6"	19'-0"	20'-10"	15'-0"	35'-4"
60°	8'-6"	19'-0"	20'-10"	18'-6"	37'-1"
	9'-0"	19'-0"	21'-0"	18'-6"	37'-6"
	9'-6"	19'-0"	21'-4"	18'-6"	37'-7"
70°	8'-6"	19'-0"	20'-10"	19'-6"	38'-8"
	9'-0"	19'-0"	21'-0"	19'-6"	38'-11"
	9'-6"	19'-0"	21'-4"	19'-6"	39'-2"
80°	8'-6"	19'-0"	20'-4"	24'-0"	38'-11"
	9'-0"	19'-0"	20'-4"	24'-0"	38'-8"
	9'-6"	19'-0"	20'-5"	24'-0"	38'-8"
90°	8'-6"	19'-0"	19'-0"	25'-0"	38'-0"
	9'-0"	19'-0"	19'-0"	25'-0"	38'-0"
	9'-6"	19'-0"	19'-0"	25'-0"	38'-0"

REV. NO.	REV. DATE	REV. BY
1	6/1/2000	HLE/RH
DIGITIZED	3/17/95	
DWG. BY PLANNING	SCALE	
CK. BY	NONE	

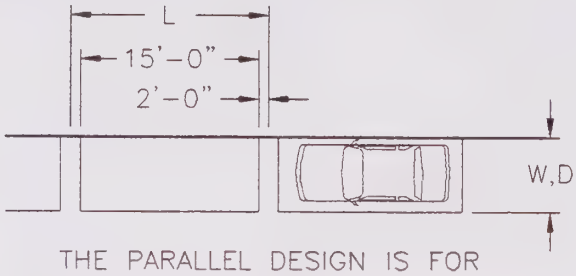
STANDARD PARKING STALL DIMENSIONS

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

DEVIATIONS FROM THIS DRAWING REQUIRE PLANNING COMMISSION APPROVAL
Finbar J. O'Rega
DATE: 01/09/02

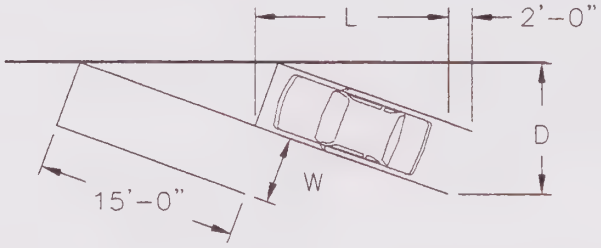
SUPERCEDES DWG. DATED 3/17/95

DRAWING NO. 41G

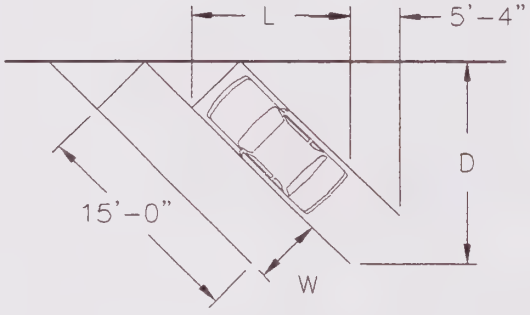


THE PARALLEL DESIGN IS FOR ON-STREET PARKING AND IS NOT GENERALLY ACCEPTABLE WITHIN PARKING LOTS.

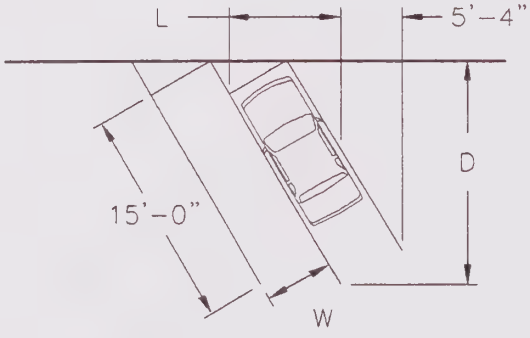
PARK ANGLE	STALL WIDTH (W)	CURB LENGTH PER CAR (L)	STALL DEPTH (D)	MIN. AISLE WIDTH
0°	7'-6"	19'-0"	7'-6"	12'-0"



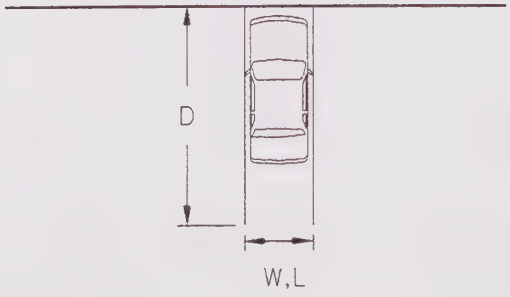
PARK ANGLE	STALL WIDTH (W)	CURB LENGTH PER CAR (L)	STALL DEPTH (D)	MIN. AISLE WIDTH
30°	7'-6"	15'-0"	14'-0"	11'-0"



PARK ANGLE	STALL WIDTH (W)	CURB LENGTH PER CAR (L)	STALL DEPTH (D)	MIN. AISLE WIDTH
45°	7'-6"	10'-7"	15'-11"	13'-6"



PARK ANGLE	STALL WIDTH (W)	CURB LENGTH PER CAR (L)	STALL DEPTH (D)	MIN. AISLE WIDTH
60°	7'-6"	8'-8"	16'-8"	18'-6"



PARK ANGLE	STALL WIDTH (W)	CURB LENGTH PER CAR (L)	STALL DEPTH (D)	MIN. AISLE WIDTH
90°	7'-6"	7'-6"	15'-0"	25'-0"

REV. NO.	REV. DATE	REV. BY
1	6/1/2000	HLE/RH
DIGITIZED	3/17/95	
DWG. BY PLANNING	SCALE	
CK. BY	NONE	

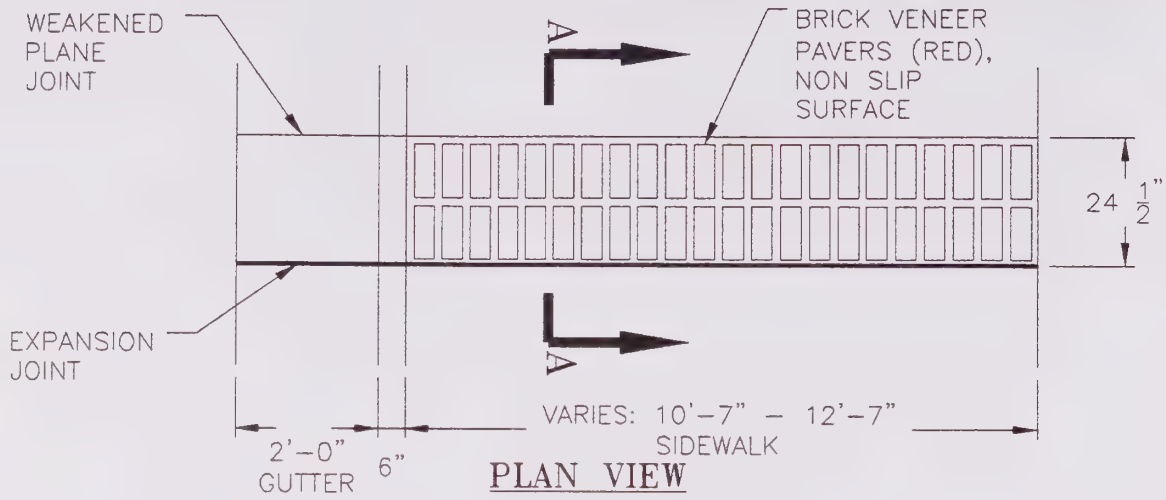
COMPACT PARKING STALL DIMENSIONS

DEVIATIONS FROM THIS DRAWING REQUIRE PLANNING COMMISSION APPROVAL
Eileen J. O'Regan
DATE: 01/09/02

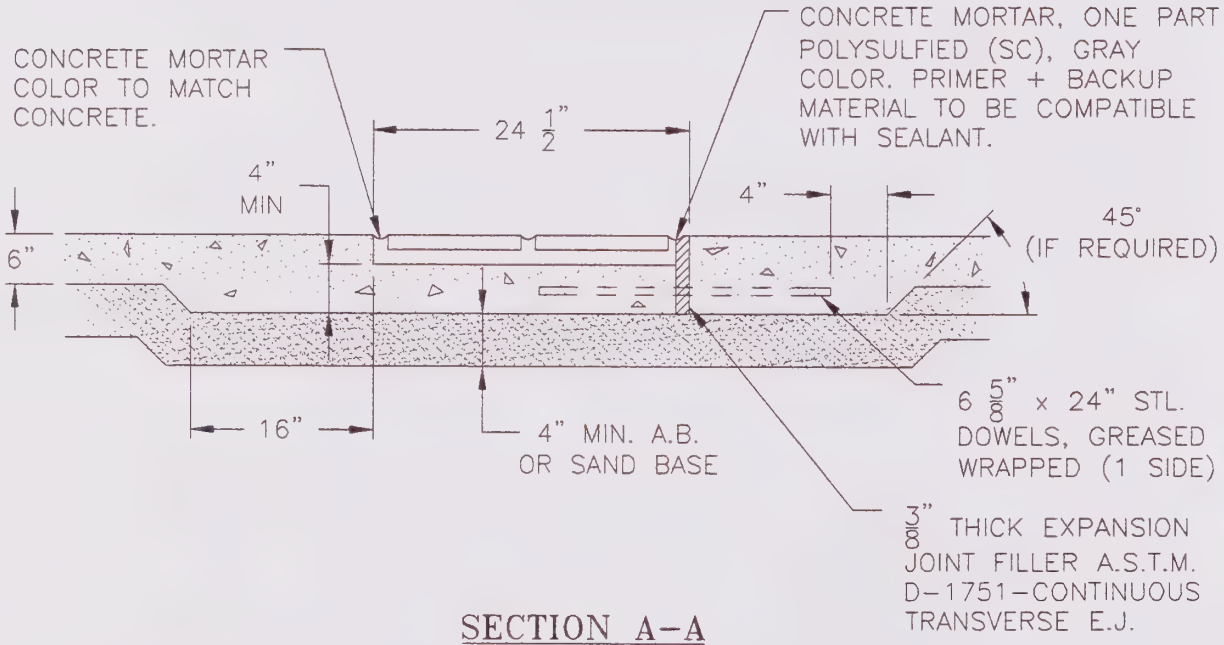
CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

SUPERCEDES DWG. DATED 3/17/95

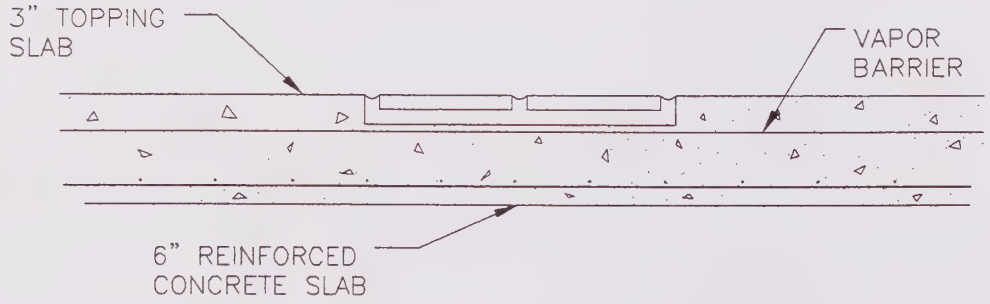
DRAWING NO. 41H



PLAN VIEW



SECTION A-A

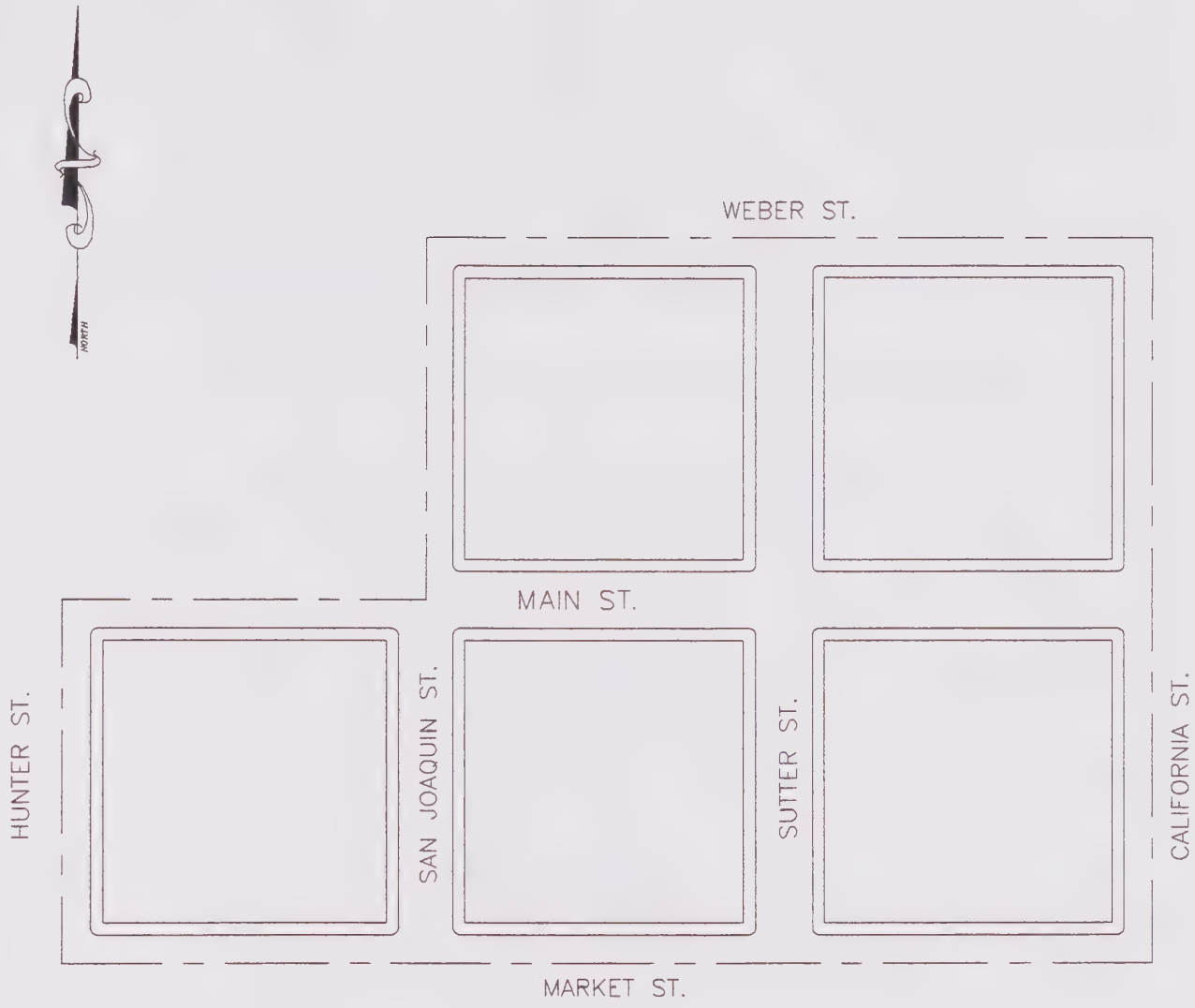


TYPICAL SIDEWALK/BASEMENT ROOF

NOTES:

1. SIDEWALK BRICK STRIPS SHALL BE EQUALLY SPACED 20'-0" TO 25'-0"± O.C.
2. REINFORCED CONCRETE SHALL BE DESIGNED AND SUBMITTED FOR APPROVAL BY THE CITY ENGINEER.

REV. NO.	REV. DATE	REV. BY	SIDEWALK BRICK STRIP	REVISION APPROVED BY CITY ENGINEER
5	6/1/2003	HL/EA		Finbar J. O'Kega
DIGITIZED	7/1/91			DATE: 11/25/03
DWG. BY RC	SCALE		CITY OF STOCKTON	SUPERCEDES DWG. DATED 1/9/02
CK. BY	NONE		DEPARTMENT OF PUBLIC WORKS	DRAWING NO. 42



REV. NO.	REV. DATE	REV. BY
1	10/7/93	SA
DIGITIZED	1/1/92	
DWG. BY	RC	SCALE
CK. BY	NS	NONE

AREA REQUIRING BRICK PAVERS IN SIDEWALKS

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

DIGITIZED VERSION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 01/09/02

SUPERCEDES DWG. DATED 7/1/87

DRAWING NO. 42A

PEAK FACTOR:

FOR AVG. FLOW < 0.5 MGD $PF = 2.29\ (AVG.\ FLOW)^{-0.338}$

FOR 0.5 MGD < AVG. FLOW < 1.8 MGD $PF = 2.50\ (AVG.\ FLOW)^{-0.216}$

FOR AVG. FLOW > 1.8 MGD $PF = 2.37\ (AVG.\ FLOW)^{-0.124}$

NOTE:

USE A MAXIMUM PEAKING FACTOR = 5

AVERAGE FLOW:	PLANNING VALUES	DESIGN VALUES	
RESIDENTIAL	GAL/DAY/ACRE	GAL/DAY/UNIT	GAL/DAY/1000S.F.
		300	
SINGLE FAMILY	2100	270	---
MULTI FAMILY	6800	270	---
PURD	3700		---
COMMERCIAL			

OFFICE	2400	---	90
RETAIL	2000	---	80
EATING AND DRINKING	8600	---	500
WHOLESALE, STORAGE	800		40
INDUSTRIAL			
		SPECIAL	
FOOD PROCESSING		---	
LIGHT	3000	---	150
HEAVY (LOW WASTEWATER)	3000	SPECIAL	150
HEAVY (HIGH WASTEWATER)			
SCHOOLS			

PRIMARY	1800	---	340
SECONDARY	1400		310

INFLOW/INFILTRATION (I/I): 400 GALS/DAY/ACRE = 0.0004 MGD/ACRE

DESIGN FLOW: (AVERAGE FLOW + I/I) PEAK FACTOR

REV. NO.	REV. DATE	REV. BY	SANITARY SEWER DESIGN DATA	REVISION APPROVED BY CITY ENGINEER
3	6/1/2000	HLE/RH		Finbar J. O'Regan
DIGITIZED	1/1/92			DATE: 01/09/02
DWG. BY RC	SCALE		CITY OF STOCKTON	SUPERCEDES DWG. DATED 6/1/94 / DRAWING NO. 45
CK. BY	NONE		DEPARTMENT OF PUBLIC WORKS	

(CONT'D FROM DWG. NO. 45)

NOTES:

1. PIPE SHALL BE DESIGNED TO HAVE A MINIMUM VELOCITY OF 2 FT/SEC AT DESIGN FLOW. THE USE OF 8" DIAMETER PIPE (NOT EXCEEDING A LENGTH OF 600' AND A MINIMUM SLOPE AS SHOWN IN TABLE ON DWG. NO. 46A) ON NON-EXTENDABLE RUN IS PERMITTED.

2. PUMPING STATIONS SHALL CONFORM TO THE REQUIREMENTS AS DESCRIBED IN CHAPTER 16 STOCKTON MUNICIPAL CODE.

3. A. PUMPING CAPACITY TO HANDLE DESIGN FLOW WITH THE LARGEST PUMP OUT OF SERVICE. THIS SHALL BE DONE BY PROVIDING A REDUNDANT PUMP.
   B. MULTIPLE PUMPS OF EQUAL CAPACITY.
   C. AT LEAST 3 PUMPS, FOR FLOW GREATER THAN 0.5 MGD OR 2 PUMPS FOR FLOW LESS THAN 0.5 MGD.
   D. PUMPING STATIONS SHALL BE EQUIPPED WITH:

      1) TELEMETRY EQUIPMENT CAPABLE OF TRANSMITTING VARIOUS ALARM CONDITIONS SUCH AS HIGH AND LOW SUMP, FLOODED DRY WELL, AND PUMP OR POWER FAILURE, TO A CENTRAL DISPATCH LOCATION.
      2) STANDBY POWER GENERATING EQUIPMENT SIZED TO OPERATE ALL PUMP STATION EQUIPMENT EXCEPT THE REDUNDANT PUMP, UNLESS IT CAN BE SHOWN THAT A SUSTAINED FAILURE WILL NOT CAUSE OVERFLOW OR FLOODING.
      3) FLOW MONITORING EQUIPMENT WITH A METER IN THE DISCHARGE LINE, PUMP RUNNING TIME RECORDERS WITH SUMP LEVEL RECORDERS, OR OTHER APPROVED METHODS. ALSO, PROVISION SHALL BE MADE FOR FACILITATING INSTALLATION OF PORTABLE GRAVITY FLOW METERS IN INFLOW METERS.
      4) EQUIPMENT AS NECESSARY (VENTILATION, FALL PROTECTION, ETC.) TO CONFORM TO O.S.H.A. AND OTHER PERTINENT REGULATORY AGENCY REGULATIONS.

   E. NON-CLOG TYPE PUMPS DESIGNED FOR SANITARY SEWAGE PUMPING.

   F. FORCE MAINS SIZED TO LIMIT VELOCITIES TO APPROXIMATELY 7 FT/SEC FOR UP TO 300 FT. IN LENGTH, TO APPROXIMATELY 5 FT/SEC FOR LENGTH IN EXCESS OF 1000 FT. THESE VALUES ARE APPROXIMATE, AND FINAL DESIGN SHOULD BE BASED UPON ANALYSIS OF A SYSTEM HEAD CURVE BASED UPON COMMERCIALLY AVAILABLE PUMPS AND PIPE DIAMETERS.

   G. ALL NEW STORMWATER PUMP STATIONS MUST BE EQUIPPED WITH A SANITARY LINE CONNECTED TO AN EXISTING SANITARY MAIN ALREADY IN SERVICE, PRIOR TO COMMISSIONING THE STATION. SANITARY SEWER LINES SHALL BE EXTENDED TO ALL NEW STORM WATER PUMP STATIONS. SEE DWG. NO. 76.

REV. NO.	REV. DATE	REV. BY	SANITARY SEWER DESIGN DATA	REVISION APPROVED BY CITY ENGINEER
4	6/1/2003	HL/EA		
DIGITIZED	1/1/92			DATE: 11/11/03
DWG. BY RC	SCALE		CITY OF STOCKTON	SUPERCEDES DWG. DATED 01/09/02
CK. BY	NONE		DEPARTMENT OF PUBLIC WORKS	DRAWING NO. 45A

SANITARY DESIGN SHEET

CITY OF STOCKTON

DEPARTMENT OF PUBLIC WORKS

DATE: _____

BY: _____

SHEET ____ OF ____

TITLE: _____

STREET/AREA	FROM MH	TO MH	ACRES*	LOTS	AVER. FLOW** (MGD)	AVER. ACCU. FLOW** (MGD)	PEAKING FACTOR	PEAK FLOW (MGD)	PIPE DIA. (IN.)	LENGTH (FT)	SLOPE (%)	d/D	CAP-ACITY FULL (MGD)	FULL VEL. (FPS)	CAP-ACITY ACTUAL FLOW (MGD)	ACTUAL VEL. (FPS)	REMARKS

* INCLUDING I/I **LOT FLOW + I/I

REV. NO.	REV. DATE	REV. BY
1	6/1/94	KB

DIGITIZED 7/1/90

DWG. BY RC

CK. BY

SCALE NONE

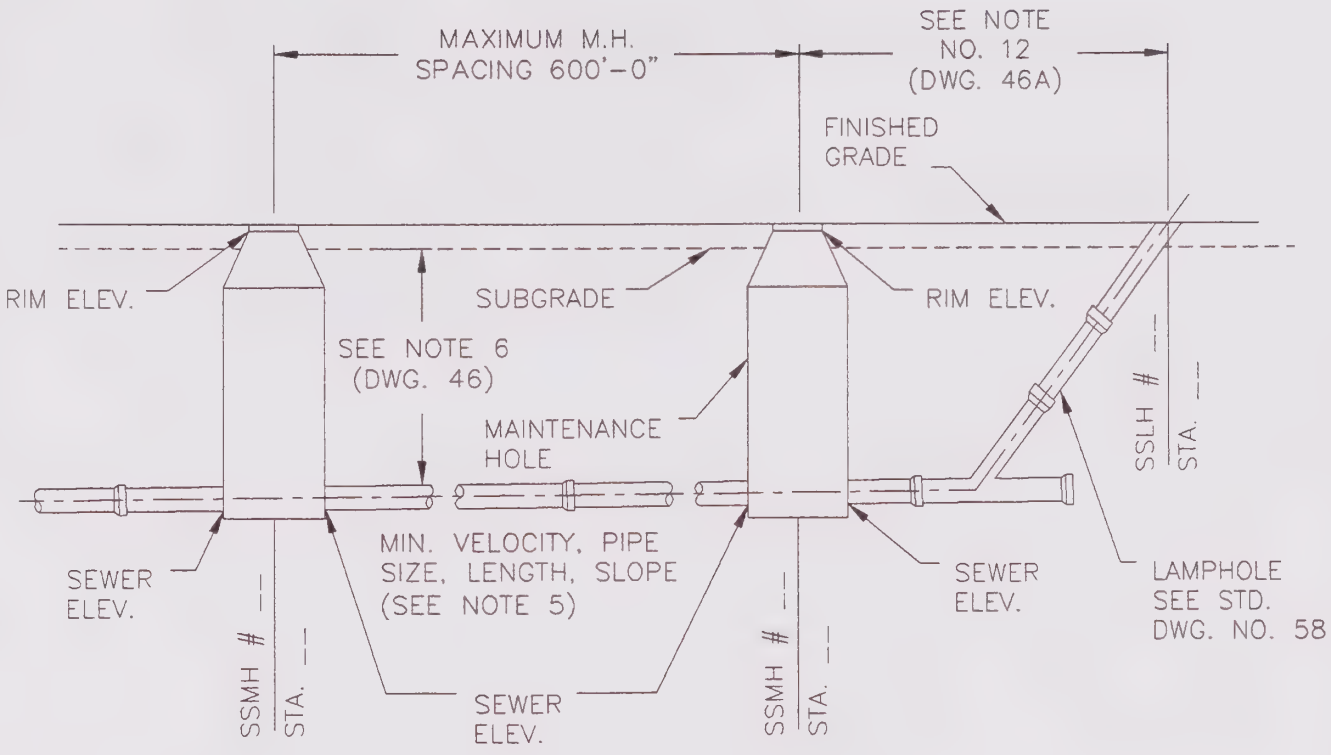
SANITARY DESIGN SHEET

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 01/09/02

SUPERCEDES DWG. DATED 7/1/90

DRAWING NO. 45B



SSLH = SANITARY SEWER LAMP HOLE.

NOTES:

1. THE MINIMUM SIZE PIPE SHALL BE 8" DIAMETER.
2. A M.H. SHALL BE INSTALLED AT ALL INTERSECTING STREETS. INTERMEDIATE M.H. SHALL BE UNIFORMLY SPACED.
3. ALL CONNECTIONS TO SANITARY SEWERS SHALL BE MADE WITH WYE OR TEE. CITY TO INSTALL SADDLE AT OWNER'S/DEVELOPER'S EXPENSE ON EXISTING LINES.
4. THE DEPARTMENT OF PUBLIC WORKS SHALL BE SUPPLIED WITH A RECORD DRAWING PLAN SHOWING LATERAL LOCATIONS BY THE ARCHITECT OR PROJECT ENGINEER.
5. PIPE SHALL BE DESIGNED TO HAVE A MINIMUM VELOCITY OF 2 FPS AT DESIGN FLOW. THE USE OF 8" DIAMETER PIPE (NOT EXCEEDING A LENGTH OF 600' AND A MINIMUM SLOPE AS SHOWN IN TABLE ON DWG NO. 46A) ON NON-EXTENDABLE RUNS IS PERMITTED.
6. SANITARY SEWERS AND SEWER LATERALS SHALL BE DESIGNED TO MINIMIZE THEIR DEPTH AT ALL LOCATIONS. MINIMUM COVER FOR SANITARY SEWERS SHALL BE 4'-6" FROM THE BOTTOM OF SUBGRADE TO THE TOP OF THE PIPE. MINIMUM COVER FOR SANITARY SEWER LATERALS SHALL BE 4'-6" FROM THE FINISHED GRADE AT BACK OF WALK TO THE TOP OF THE LATERAL. IN RESIDENTIAL AREAS, THE DEPTH OF THE SEWER LATERAL, FROM THE FINISHED GRADE AT BACK OF WALK TO TOP OF LATERAL, SHALL BE NO GREATER THAN 7'-0" AT THE PROPERTY LINE. WHERE MINIMUM COVER CANNOT BE OBTAINED, ONLY DUCTILE IRON PIPE OR SDR 26 PIPE SHALL BE USED. CONCRETE ENCASEMENT MAY BE USED IN CERTAIN AREAS ONLY IF APPROVED BY THE CITY ENGINEER. SEE STANDARD DRAWING NO. 61.

REV. NO.	REV. DATE	REV. BY
5	6/1/2003	HL/EA
DIGITIZED	7/1/91	
DWG. BY	RC	SCALE
CK. BY		NONE

SANITARY SEWER DATA

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 11/25/03

SUPERCEDES DWG. DATED	DRAWING NO.
01/09/02	46

(CONT'D FROM DWG. 46)

NOTES:

7. CUT SHEETS SHALL BE SUPPLIED TO THE CITY ENGINEER PRIOR TO THE CONSTRUCTION OF SANITARY SEWER.
8. ALL SEWERS MUST BE DESIGNED FOR GRAVITY FLOW UNLESS OTHERWISE PERMITTED BY SPECIAL APPROVAL OF THE CITY ENGINEER. THE CITY REQUIRES MATCHING OF TOPS OF PIPES (CROWNS) RATHER THAN INVERTS UNLESS AN ALTERNATE DESIGN IS APPROVED BY THE CITY ENGINEER AT THE TENTATIVE MAP OR MASTER PLAN STAGE.
9. PIPES AND STRUCTURES SHALL BE LABELED WITH STATIONS AND ELEVATIONS AS SHOWN ABOVE.
10. A SEWER DESIGN SHEET (STD. DWG. NO. 45B) SHALL BE SUBMITTED WITH ALL PROJECT DESIGNS.
11. MANNING "N" SHALL NOT BE LESS THAN 0.011 FOR P.V.C. AND H.D.P.E PIPE, OR LESS THAN 0.013 FOR OTHER PIPE MATERIALS. THE FOLLOWING SLOPES SHALL BE USED AS MINIMUMS:

PIPE SIZE	MIN. SLOPE (N=0.013)	MIN. SLOPE (N=0.011)
6" DIA.	.0070 FT/FT	.0050 FT/FT
8" DIA.	.0045 FT/FT	.0032 FT/FT
10" DIA.	.0025 FT/FT	.0018 FT/FT
12" DIA.	.0020 FT/FT	.0014 FT/FT
15" DIA.	.0015 FT/FT	.0011 FT/FT
18" DIA.	.0012 FT/FT	.0009 FT/FT

12. MAX. 150'–0" LAMPHOLE SPACING, FOR USE ON SHORT RUNS OF PIPE THAT WILL BE EXTENDED AND A M.H. INSTALLED AT A LATER DATE.
13. SANITARY SEWER LATERAL DEPTH IN RESIDENTIAL AREAS SHALL NOT EXCEED 12'–0" FROM THE FINISHED GRADE TO THE POINT OF CONNECTION AT THE SEWER MAIN LINE. (SEE STD. DWG. NO. 63)
14. NO DIRECT SERVICE TAPS SHALL BE ALLOWED ON SEWER MAINS 15" AND LARGER.
15. FOR SANITARY SEWER SERVICE CONNECTIONS TO M.H.'S, NO MORE THAN 1 SHALL BE ALLOWED PER QUADRANT (i.e., IN ANY 1/4 OF THE PERIMETER).

REV. NO.	REV. DATE	REV. BY
4	6/1/2000	HLE/RH
DIGITIZED	7/1/91	

SANITARY SEWER DATA

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 01/09/02

DWG. BY	RC	SCALE
CK. BY		NONE

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

SUPERCEDES DWG. DATED	DRAWING NO.
2/23/95	46A

STATE OF CALIFORNIA
DEPARTMENT OF HEALTH
CRITERIA FOR THE SEPARATION OF WATER MAINS WITH SANITARY SEWERS AND STORM SEWERS

A. BASIC STANDARDS

THE "CALIFORNIA WATERWORKS STANDARDS" SETS FORTH THE MINIMUM SEPARATION REQUIREMENT FOR WATER MAINS WITH SANITARY AND STORM SEWER LINES. THESE STANDARDS, CONTAINED IN SECTION 64630, TITLE 22, CALIFORNIA ADMINISTRATIVE CODE, SPECIFY:

1) PARALLEL CONSTRUCTION: THE HORIZONTAL DISTANCE BETWEEN PRESSURE WATER MAINS AND SEWER LINES SHALL BE AT LEAST 10 FEET.
2) PERPENDICULAR CONSTRUCTION (CROSSING): PRESSURE WATER MAINS SHALL BE AT LEAST ONE FOOT ABOVE SANITARY SEWER LINES WHERE THESE LINES MUST CROSS.
3) SEPARATION DISTANCES SPECIFIED ABOVE SHALL BE MEASURED FROM THE NEAREST EDGES OF THE FACILITIES.
4) WATER MAINS AND SEWER LINES MUST NOT BE INSTALLED IN THE SAME TRENCH.
5) WATER MAINS AND SEWERS OF 24 INCHES DIAMETER OR GREATER MAY CREATE SPECIAL HAZARDS BECAUSE OF THE LARGE VOLUMES OF FLOW. INSTALLATIONS OF WATER MAINS AND SEWER LINES 24 INCHES DIAMETER OR LARGER MUST BE REVIEWED AND APPROVED BY THE HEALTH AGENCY AND CITY ENGINEER PRIOR TO CONSTRUCTION.
6) WHEREVER THE WORD "SEWER" IS USED IN CONNECTION WITH ANY REQUIREMENTS AS SHOWN ON DRAWINGS 47, 48, AND 49 THE WORD SHALL APPLY EQUALLY TO SANITARY OR STORM SEWER INSTALLATIONS.

B. EXCEPTIONS TO BASIC SEPARATION STANDARDS

LOCAL CONDITIONS, SUCH AS AVAILABLE SPACE, LIMITED SLOPE, EXISTING STRUCTURES, ETC., MAY CREATE A SITUATION WHERE THERE IS NO ALTERNATIVE BUT TO INSTALL WATER MAINS OR SEWER LINES AT A DISTANCE LESS THAN THAT REQUIRED BY THE BASIC SEPARATION STANDARDS. IN SUCH CASES, ALTERNATIVE CONSTRUCTION CRITERIA AS SPECIFIED IN SECTION C SHALL BE FOLLOWED, SUBJECT TO THE SPECIAL PROVISIONS IN SECTION D.

C. ALTERNATE CRITERIA FOR CONSTRUCTION

THE CONSTRUCTION CRITERIA FOR SEWER LINES OR WATER MAINS WHERE THE BASIC SEPARATION STANDARDS CANNOT BE ATTAINED ARE SHOWN ON DRAWINGS 48 AND 49. THERE ARE TWO SITUATIONS ENCOUNTERED:

CASE 1 -- NEW SEWER LINE – NEW OR EXISTING WATER MAIN.

CASE 2 -- NEW WATER MAIN – EXISTING SEWER LINE.

FOR CASE 1, THE ALTERNATE CONSTRUCTION CRITERIA APPLY TO THE SEWER LINE.

FOR CASE 2, THE ALTERNATE CONSTRUCTION CRITERIA MAY APPLY TO EITHER OR BOTH WATER MAIN AND SEWER LINE.

THE CONSTRUCTION CRITERIA APPLY TO THE HOUSE LATERALS THAT CROSS ABOVE A PRESSURE WATER MAIN BUT NOT TO THOSE HOUSE LATERALS THAT CROSS BELOW A PRESSURE WATER MAIN.

CASE 1: NEW SEWER BEING INSTALLED (DRAWING NO. 48)

REV. NO.	REV. DATE	REV. BY
3	6/1/2000	HLE/RH
DIGITIZED	1/1/92	
DWG. BY	RC	SCALE
CK. BY	NS	NONE

CALIFORNIA HEALTH
DEPARTMENT REQUIREMENTS

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

DIGITIZED VERSION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 01/09/02

SUPERCEDES DWG. DATED 2/23/95

DRAWING NO. 47

(CONT'D FROM DWG. 47)

ZONE	SPECIAL CONSTRUCTION REQUIRED FOR SEWER
A	SEWER LINES PARALLEL TO WATER MAINS SHALL NOT BE PERMITTED IN THIS ZONE WITHOUT APPROVAL FROM THE RESPONSIBLE HEALTH AGENCY AND WATER SUPPLIER.
B	A SEWER LINE PLACED PARALLEL TO A WATER LINE SHALL BE CONSTRUCTED OF: 1. EXTRA STRENGTH VITRIFIED CLAY PIPE WITH COMPRESSION JOINTS. 2. PLASTIC SEWER PIPE WITH RUBBER RING JOINTS (PER ASTM D3034) OR EQUIVALENT. 3. CAST OR DUCTILE IRON PIPE WITH COMPRESSION JOINTS.
C	A SEWER LINE CROSSING A WATER MAIN SHALL BE CONSTRUCTED OF: 1. DUCTILE IRON PIPE WITH HOT DIP BITUMINOUS COATING AND MECHANICAL JOINTS. 2. A CONTINUOUS SECTION OF CLASS 200 (DR 14 PER AWWA C900) PLASTIC PIPE OR EQUIVALENT, CENTERED OVER THE PIPE BEING CROSSED. 3. ANY SEWER PIPE WITHIN A CONTINUOUS SLEEVE.
D	A SEWER LINE CROSSING A WATER MAIN SHALL BE CONSTRUCTION OF: 1. A CONTINUOUS SECTION OF DUCTILE IRON PIPE WITH HOT DIP BITUMINOUS COATING. 2. A CONTINUOUS SECTION OF CLASS 200 (DR 14 PER AWWA C900) PLASTIC PIPE OR EQUIVALENT, CENTERED ON THE PIPE BEING CROSSED. 3. ANY SEWER PIPE WITHIN A CONTINUOUS SLEEVE.

CASE 2: NEW WATER MAINS BEING INSTALLED (DRAWING NO. 49)

ZONE	SPECIAL CONSTRUCTION REQUIRED FOR SEWER
A	NO WATER MAINS PARALLEL TO SEWERS SHALL BE CONSTRUCTED WITHOUT APPROVAL FROM THE HEALTH AGENCY.
B	IF THE SEWER PARALLELING THE WATER MAIN DOES NOT MEET THE CASE 1, ZONE B, REQUIREMENTS, THE WATER MAIN SHALL BE CONSTRUCTED OF: 1. CEMENT LINED DUCTILE IRON PIPE WITH HOT DIP BITUMINOUS COATING. 2. DIPPED AND WRAPPED ONE-FOURTH-INCH-THICK WELDED STEEL PIPE. 3. CLASS 200, TYPE II, ASBESTOS-CEMENT PRESSURE PIPE. 4. CLASS 200 PRESSURE RATED PLASTIC WATER PIPE (DR 14 PER AWWA C900) OR EQUIVALENT. 5. REINFORCED CONCRETE PRESSURE PIPE, STEEL CYLINDER TYPE, PER AWWA (C300-74 OR C301-79 OR C303-70).
C	IF THE SEWER CROSSING THE WATER MAIN DOES NOT MEET THE CASE 1, ZONE C, REQUIREMENTS, THE WATER MAIN SHALL HAVE NO JOINTS IN ZONE C AND BE CONSTRUCTED OF:

REV. NO.	REV. DATE	REV. BY
3	6/1/2000	HLE/RH
DIGITIZED	1/1/92	
DWG. BY	RC	SCALE
CK. BY	NS	NONE

CALIFORNIA HEALTH DEPARTMENT REQUIREMENTS

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

DIGITIZED VERSION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 01/09/02

SUPERCEDES DWG. DATED 2/23/95

DRAWING NO. 47A

(CONT'D FROM DWG. 47A)

1. CEMENT LINED DUCTILE IRON PIPE WITH HOT DIP BITUMINOUS COATING.
2. CLASS 200 PRESSURE RATED PLASTIC WATER PIPE (DR 14 PER AWWA C900) OR EQUIVALENT.
3. REINFORCED CONCRETE PRESSURE PIPE, STEEL CYLINDER TYPE, PER AWWA (C300–74 OR C301–79 OR C303–70). REQUIRES SPECIFIC DESIGN APPROVAL OF PIPE AND FITTING PRIOR TO POSSIBLE USE.

D IF THE SEWER CROSSING THE WATER MAIN DOES NOT MEET THE REQUIREMENTS FOR ZONE D, CASE 1, THE WATER MAIN SHALL HAVE NO JOINTS WITHIN FOUR FEET FROM EITHER SIDE OF THE SEWER AND SHALL BE CONSTRUCTED OF:

1. CEMENT LINED DUCTILE IRON PIPE WITH HOT DIP BITUMINOUS COATING.
2. CLASS 200 PRESSURE RATED PLASTIC WATER PIPE (DR 14 PER AWWA C900) OR EQUIVALENT.
3. REINFORCED CONCRETE PRESSURE PIPE, STEEL CYLINDER TYPE, PER AWWA (C300–74 OR C301–79 OR C303–70). REQUIRES SPECIFIC DESIGN APPROVAL OF PIPE AND FITTING PRIOR TO POSSIBLE USE.

D SPECIAL PROVISIONS

1. THE BASIC SEPARATION STANDARDS ARE APPLICABLE UNDER NORMAL CONDITIONS FOR SEWAGE COLLECTION LINES AND WATER DISTRIBUTION MAINS. MORE STRINGENT REQUIREMENTS MAY BE NECESSARY IF CONDITIONS, SUCH AS HIGH GROUND WATER EXIST.
2. SEWER LINES SHALL NOT BE INSTALLED WITHIN 25 FEET HORIZONTALLY OF A LOW HEAD (5 PSI OR LESS PRESSURED) WATER MAIN.
3. NEW WATER MAINS AND SEWER SHALL BE PRESSURE TESTED WHERE THE CONDUITS ARE LOCATED TEN FEET APART OR LESS.
4. IN THE INSTALLATION OF WATER MAINS OR SEWER LINES, MEASURES SHOULD BE TAKEN TO PREVENT OR MINIMIZE DISTURBANCES OF THE EXISTING LINE.
5. SPECIAL CONSIDERATION SHALL BE GIVEN TO THE SELECTION OF PIPE MATERIALS IF CORROSIVE CONDITIONS ARE LIKELY TO EXIST.
6. SEWER FORCE MAINS

   a. SEWER FORCE MAINS SHALL NOT BE INSTALLED WITHIN TEN FEET (HORIZONTALLY) OF A WATER MAIN.
   b. WHEN A SEWER FORCE MAIN MUST CROSS A WATER LINE, THE FORCE MAIN SHOULD BE AS CLOSE TO PERPENDICULAR AS PRACTICAL. THE SEWER FORCE MAIN SHOULD BE AT LEAST ONE FOOT BELOW THE WATER LINE.
   c. WHEN A NEW SEWER FORCE MAIN CROSSES UNDER AN EXISTING WATER MAIN, ALL PORTIONS OF THE SEWER FORCE MAIN WITHIN TEN FEET (HORIZONTALLY) OF THE WATER MAIN SHALL BE ENCLOSED IN A CONTINUOUS SLEEVE.
   d. WHEN A NEW WATER MAIN CROSSES OVER AN EXISTING SEWER FORCE MAIN, THE WATER MAIN SHALL BE CONSTRUCTED OF PIPE MATERIALS WITH A MINIMUM RATED WORKING PRESSURE OF 200 PSI OR EQUIVALENT PRESSURE RATING.

REV. NO.	REV. DATE	REV. BY
3	6/1/2000	HLE/RH
DIGITIZED	1/1/92	
DWG. BY	RC	SCALE
CK. BY	NS	NONE

CALIFORNIA HEALTH
DEPARTMENT REQUIREMENTS

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

DIGITIZED VERSION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 01/09/02

SUPERCEDES DWG. DATED 2/23/95

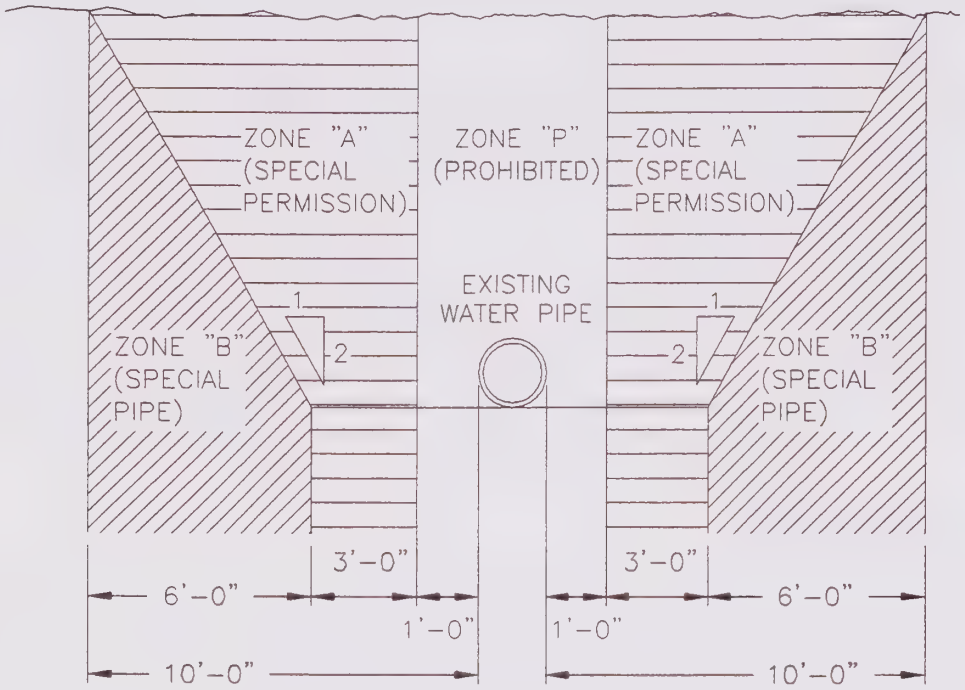
DRAWING NO. 47B

SPECIAL CONSTRUCTION REQUIREMENTS

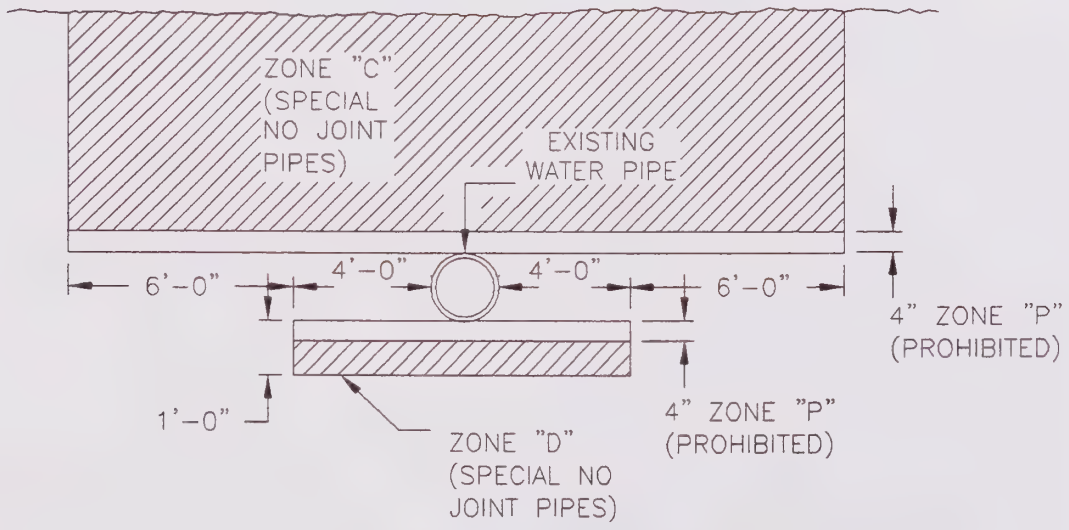
(TO BE USED ONLY WHERE REQUIRED SEPARATION CANNOT BE OBTAINDED)

CASE 1 – NEW SEWER BEING INSTALLED

ZONES A.B.C. AND D INDICATE RESTRICTED AREAS.
ZONES P INDICATE PROHIBITED USE AREAS.



PARALLEL CONSTRUCTION



PERPENDICULAR CONSTRUCTION

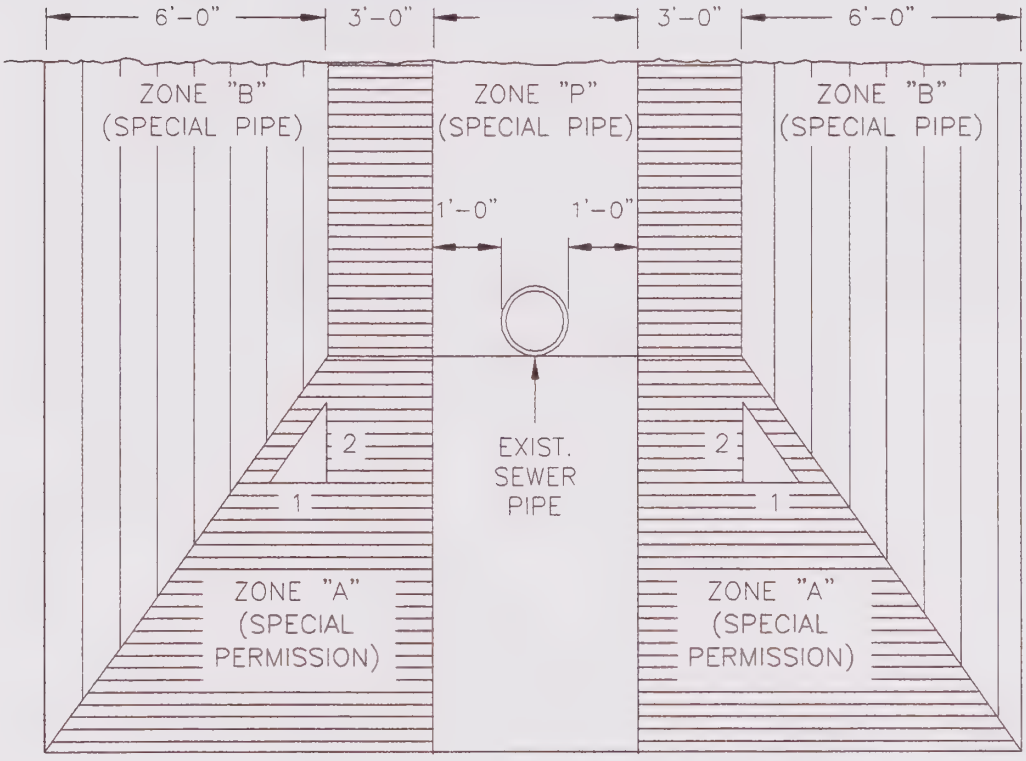
REV. NO.	REV. DATE	REV. BY	CALIFORNIA HEALTH DEPARTMENT REQUIREMENTS	DIGITIZED VERSION APPROVED BY CITY ENGINEER Finbar J. O'Regan DATE: 01/09/02	
1	2/23/95	KB/DE			
DIGITIZED	1/1/92				
DWG. BY	RC	SCALE	CITY OF STOCKTON DEPARTMENT OF PUBLIC WORKS	SUPERCEDES DWG. DATED 7/1/85	DRAWING NO. 48
CK. BY		NONE			

SPECIAL CONSTRUCTION REQUIREMENTS

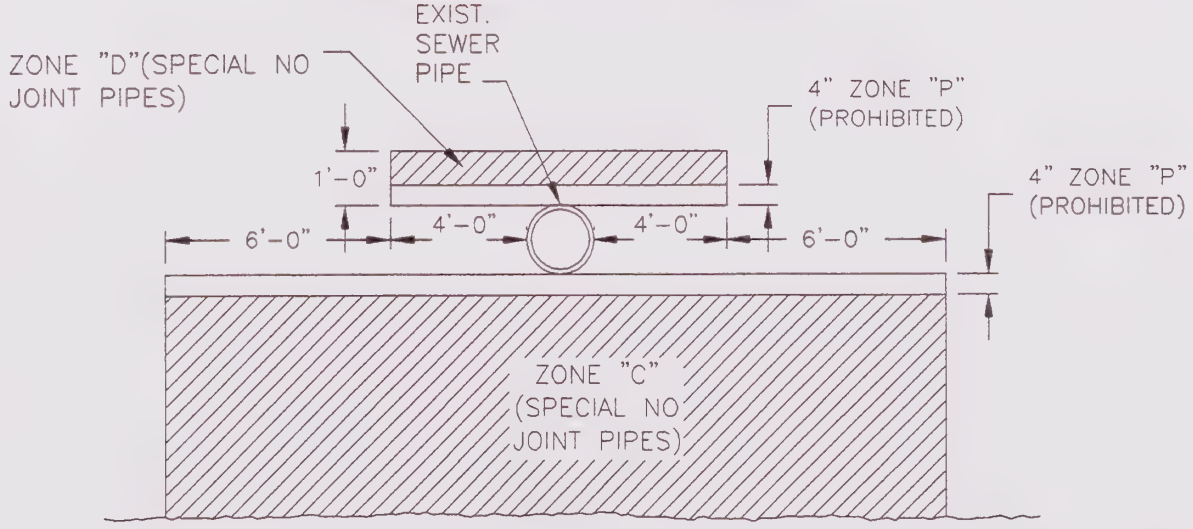
(TO BE USED ONLY WHERE REQUIRED SEPARATION CANNOT BE OBTAINDED)

CASE 2 – NEW WATER LINE BEING INSTALLED

ZONES A.B.C. AND D INDICATE RESTRICTED AREAS.
ZONES P INDICATE PROHIBITED USE AREAS.



PARALLEL CONSTRUCTION



PERPENDICULAR CONSTRUCTION

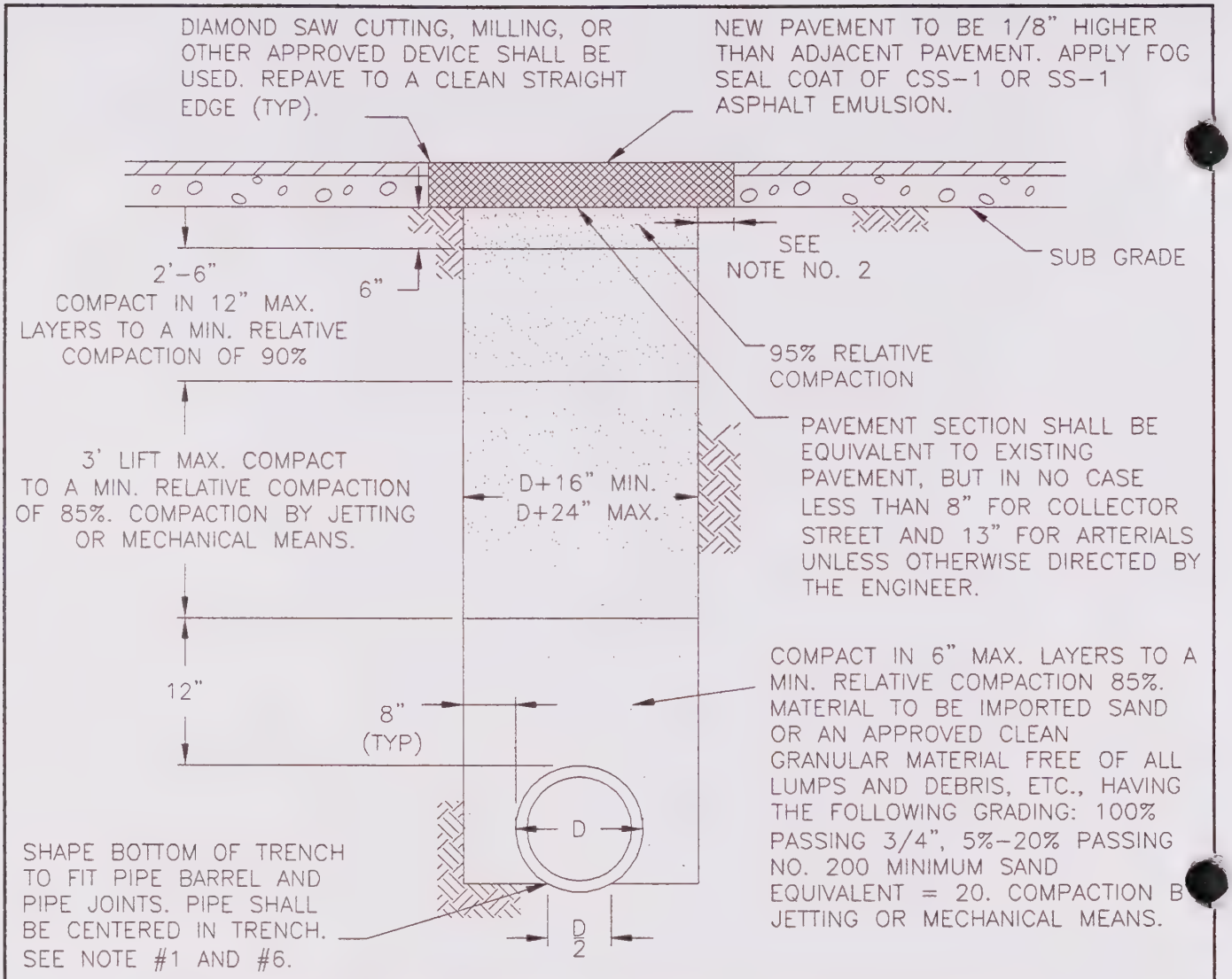
REV. NO.	REV. DATE	REV. BY
1	2/23/95	KB/DE
DIGITIZED	1/1/92	
DWG. BY	RC	SCALE
CK. BY		NONE

CALIFORNIA HEALTH DEPARTMENT REQUIREMENTS

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

DIGITIZED VERSION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 01/09/02

SUPERCEDES DWG. DATED	DRAWING NO.
7/1/85	49

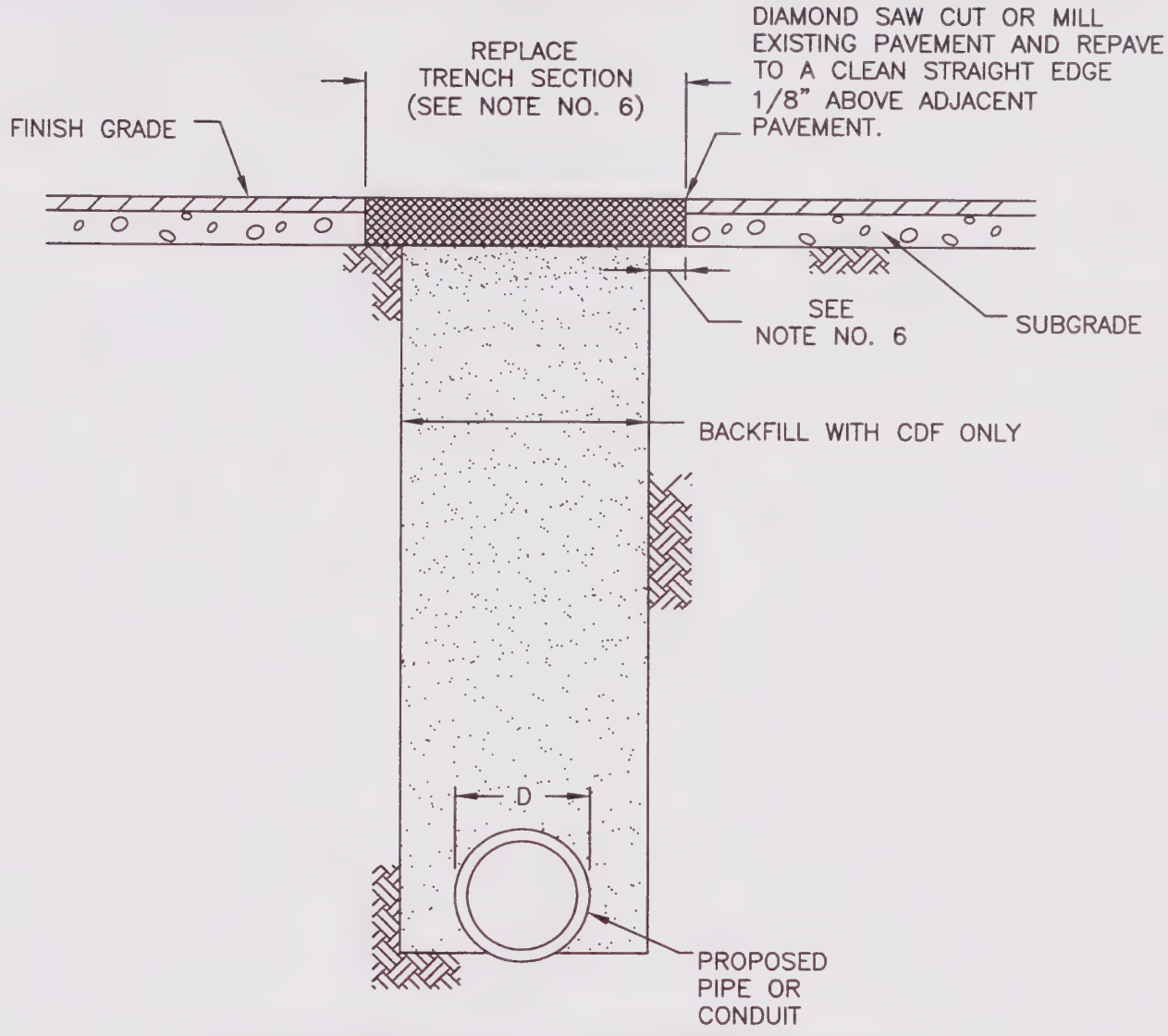


TYPICAL TRENCH SECTION IN EXISTING IMPROVED STREETS

NOTES

1. FOR RIGID PIPE, CONTRACTOR MAY, AT THEIR EXPENSE, EXCAVATE 6" BELOW THE BOTTOM OF THE PIPE AND REPLACE WITH SAND OR AGGREGATE SUBBASE IN LIEU OF SHAPING BOTTOM OF TRENCH TO FIT PIPE BARREL. JOINTS SHALL BE SHAPED IN EITHER CASE. COMPACT TO 85%.
2. WHEN TRENCH AND EXCAVATION IS IN EXISTING PAVED STREETS, REPLACE PAVEMENT 12" ON EACH SIDE OF TRENCH, 6" FOR BORE PITS, BELL HOLES AND POT HOLES LESS THAN 50 SQUARE FEET.
3. DEVIATION FROM ABOVE MAY BE ALLOWED WHEN APPROVED BY THE CITY ENGINEER.
4. TRENCH - WHERE THE TRENCH SECTION PARALLELS THE EXISTING CURB AND GUTTER, THE EDGE OF THE TRENCH SHALL BE A MIN. OF 1'-0" FROM LIP OF THE EXISTING GUTTER. THE PAVEMENT SHALL BE REMOVED AND REPLACED TO THE LIP OF THE GUTTER.
5. CONTROLLED DENSITY FILL (CDF) MAY BE USED IN LIEU OF SPECIFIED BACKFILL METHOD. MINIMUM TRENCH WIDTH MAY BE REDUCED TO 2-1/2" CLEAR OF EACH SIDE OF PIPE.
6. FLEXIBLE PIPE SHALL HAVE A 6" BEDDING OF GRANULAR MATERIAL AS DESCRIBED IN NOTE NO. 1.
7. ALL VERTICAL EDGES OF EXISTING ASPHALT CONCRETE SHALL BE TACK COATED.

REV. NO.	REV. DATE	REV. BY	EXISTING STREET TRENCH SECTION FOR TRENCHES WIDER THAN 8"	REVISION APPROVED BY CITY ENGINEER
5	6/1/2003	HL/EA		Finbar J. O'Regan
DIGITIZED	7/1/91			DATE: 11/25/03
DWG. BY RC	SCALE		CITY OF STOCKTON DEPARTMENT OF PUBLIC WORKS	SUPERCEDES DWG. DATED 01/09/02
CK. BY	NONE			DRAWING NO. 50



TYPICAL TRENCH SECTION IN EXISTING STREETS

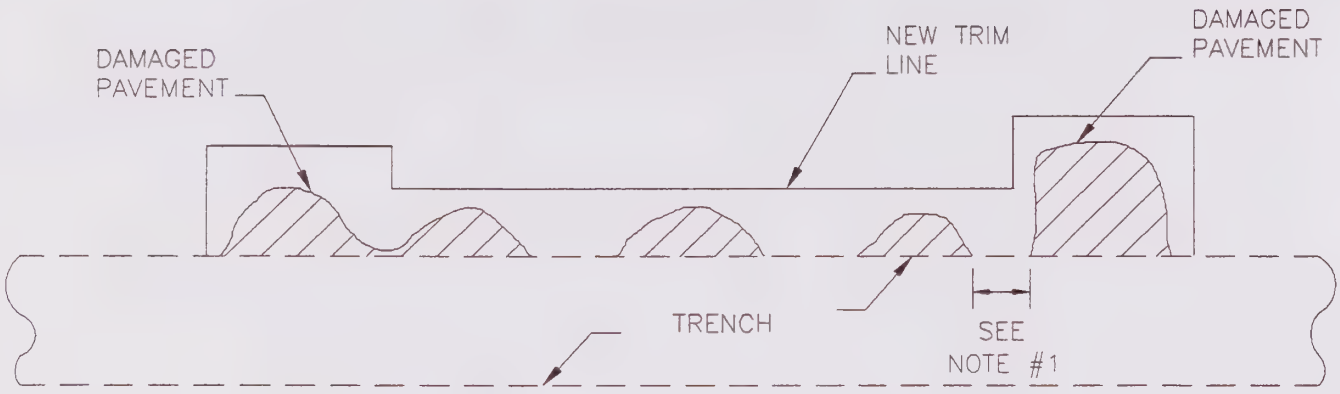
NOTES:

1. TRENCH – WHERE THE TRENCH SECTION PARALLELS THE EXISTING CURB AND GUTTER. THE EDGE OF THE TRENCH SHALL BE A MIN. OF 1'–0" FROM THE LIP OF THE EXISTING GUTTER AND THE PAVEMENT SHALL BE REMOVED AND REPLACED TO THE LIP OF THE GUTTER.
2. BACKFILL – CONTROLLED DENSITY FILL (CDF) SHALL BE MANDATORY FOR TRENCHES 8" WIDE OR LESS AS PER SECTION 19–3.066 OF THE STANDARD SPECIFICATIONS.
3. APPLY FOG SEAL COAT OF CSS–1 OR SS–1 ASPHALT EMULSION.
4. PAVING SHALL CONFORM TO SECTION 100–6 OF THESE STANDARDS AND SPECIFICATIONS.
5. ALL VERTICAL EDGES OF EXISTING ASPHALT CONCRETE SHALL BE TACK COATED.
6. GRIND 3" DEEP, 12" EACH SIDE OF TRENCH, AND REPAVE.

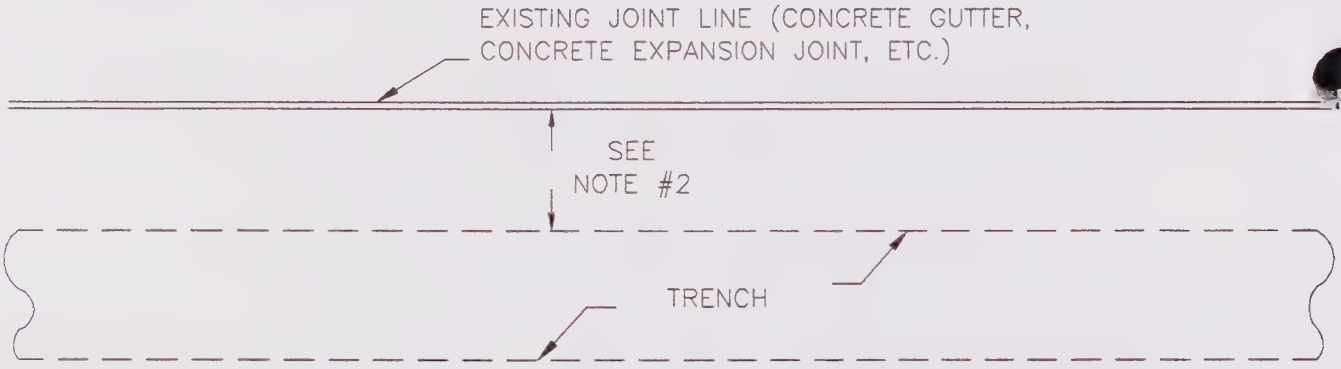
REV. NO.	REV. DATE	REV. BY	EXISTING STREET TRENCH SECTION FOR TRENCHES 8" WIDE & LESS	REVISION APPROVED BY CITY ENGINEER
4	6/1/2003	HL/EA		Finbar J. O'Regan
DIGITIZED	7/1/91			DATE: 11/25/03
DWG. BY RC	SCALE		CITY OF STOCKTON	SUPERCEDES DWG. DATED 01/09/02
CK. BY	NONE		DEPARTMENT OF PUBLIC WORKS	DRAWING NO. 50A

G:\PW\PRW\PUBLIC WORKS\ACAD\DRAWINGS\STDS_2000\050_059\50A.DWG

PLAN – CASE 1



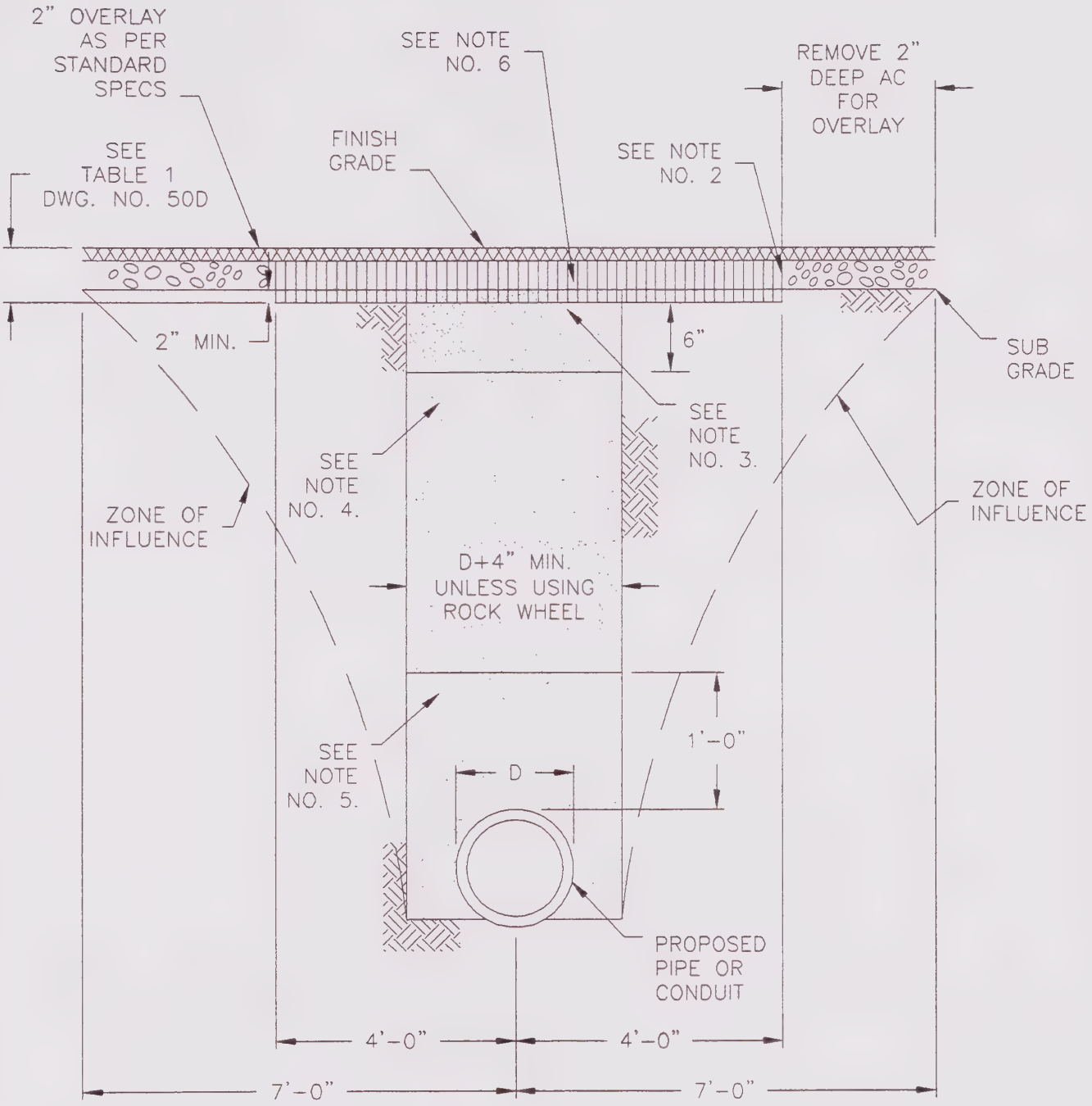
PLAN – CASE 2



NOTES

1. UNDAMAGED PAVEMENT OF 3'–0" OR LESS BETWEEN DAMAGED SECTIONS OF PAVEMENT SHALL BE REMOVED AND REPAVED WITH TRENCH RESTORATION.
2. UNDAMAGED PAVEMENT OF 3'–0" OR LESS BETWEEN EDGE OF TRENCH AND EXISTING JOINT LINE SHALL BE REMOVED AND REPAVED WITH TRENCH RESTORATION.

REV. NO.	REV. DATE	REV. BY	TRENCH SECTION (EXISTING STREET) ADDITIONAL PAVEMENT RESTORATION	REVISION APPROVED BY CITY ENGINEER Finbar J. O'Kegan DATE: 01/09/02	
2	6/1/2000	HLE/RH			
DIGITIZED	7/1/91				
DWG. BY RC	SCALE		CITY OF STOCKTON DEPARTMENT OF PUBLIC WORKS	SUPERCEDES DWG. DATED 10/7/93	DRAWING NO. 50B
CK. BY	NONE				



TYPICAL OVERLAY OVER TRENCH

SEE DWG. NO. 50D FOR TABLE AND NOTES.

REV. NO.	REV. DATE	REV. BY
1	6/1/2003	HL/EA
DIGITIZED		
DWG. BY HLE	SCALE	
CK. BY	NONE	

ALTERNATIVE TRENCH OVERLAY

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

NEW DRAWING APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 11/25/03

SUPERCEDES DWG. DATED 01/09/02

DRAWING NO. 50C

(CONT'D FROM DWG. 50C)

TABLE 1

TI	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10.0
DEEP LIFT AC (INCHES)	9.50	10.50	11.0	11.0	12.50	13.50	14.50	15.50	16.00	17.00	17.50
R VALUE = 5.0											

NOTES:

1. IF THE TRENCH IS ADJACENT TO LIP OF GUTTER, ONLY 7'-0" WIDE OVERLAY IS REQUIRED.
2. DIAMOND SAWCUT OR MILL EXISTING PAVEMENT REPAVE TO A CLEAN STRAIGHT EDGE 1/8" ABOVE ADJACENT PAVEMENT.
3. 95% RELATIVE COMPACTION.
4. 90% RELATIVE COMPACTION.
5. 85% RELATIVE COMPACTION. ON TRENCH DEPTHS 18" OR LESS, RELATIVE COMPACTION SHALL BE 95%.
6. CONSTRUCT DEEP LIFT AC PAVEMENT AS PER ABOVE TABLE 1.
7. FOR R VALUES GREATER THAN 5, SUBMIT GEOTECH AND STRUCTURAL DEEP LIFT PAVEMENT CALCULATIONS.
8. CONTACT THE CITY OF STOCKTON, PERMIT CENTER TO ACQUIRE THE LATEST TI VALUE.

REV. NO.	REV. DATE	REV. BY
	6/1/2000	HLE/RH
DIGITIZED		
DWG. BY HLE	SCALE	
CK. BY	NONE	

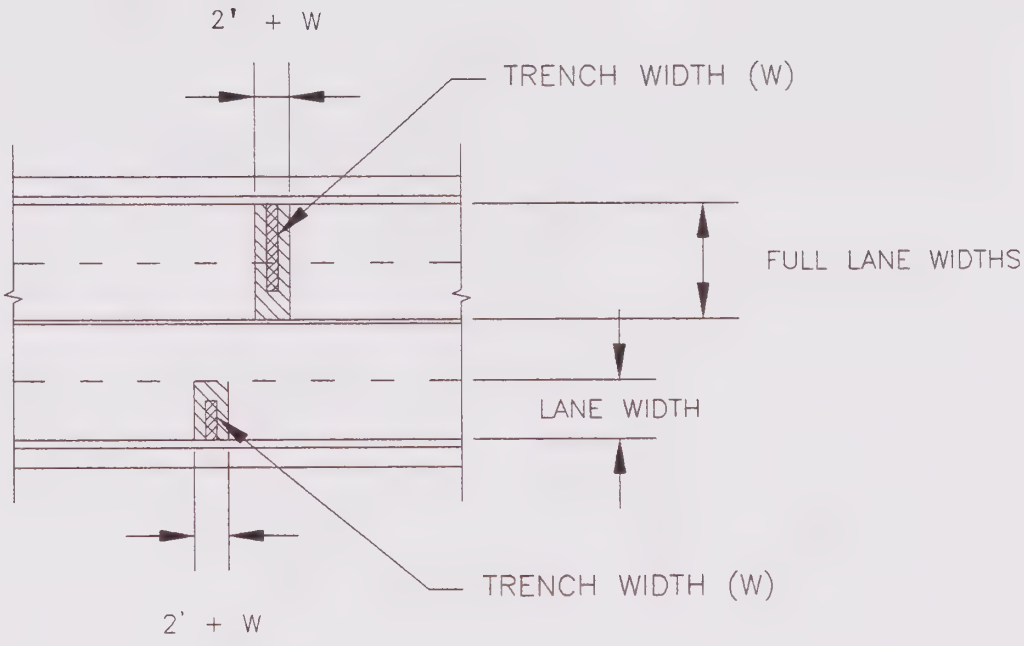
ALTERNATIVE TRENCH OVERLAY

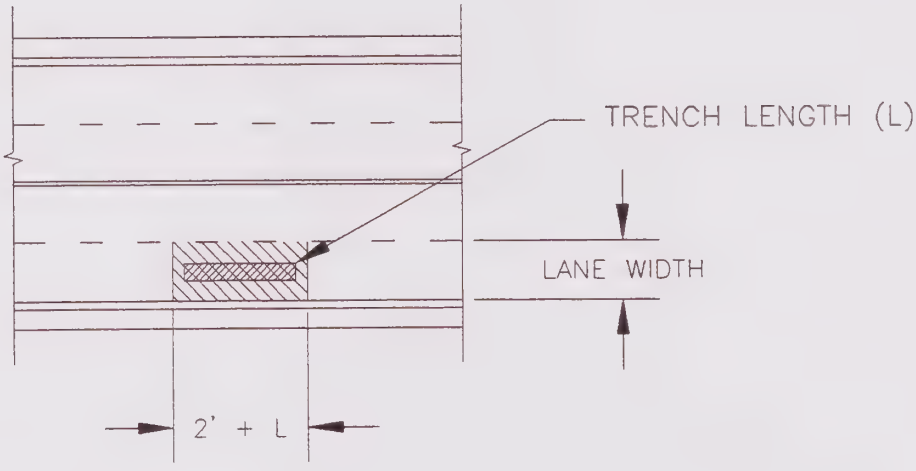
CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

NEW DRAWING APPROVED BY CITY ENGINEER
Finbarr J. O'Kega
DATE: 01/09/02

SUPERCEDES DWG. DATED

DRAWING NO. 50D





REV. NO.	REV. DATE	REV. BY
1	6/1/2003	HL/EA
DIGITIZED		

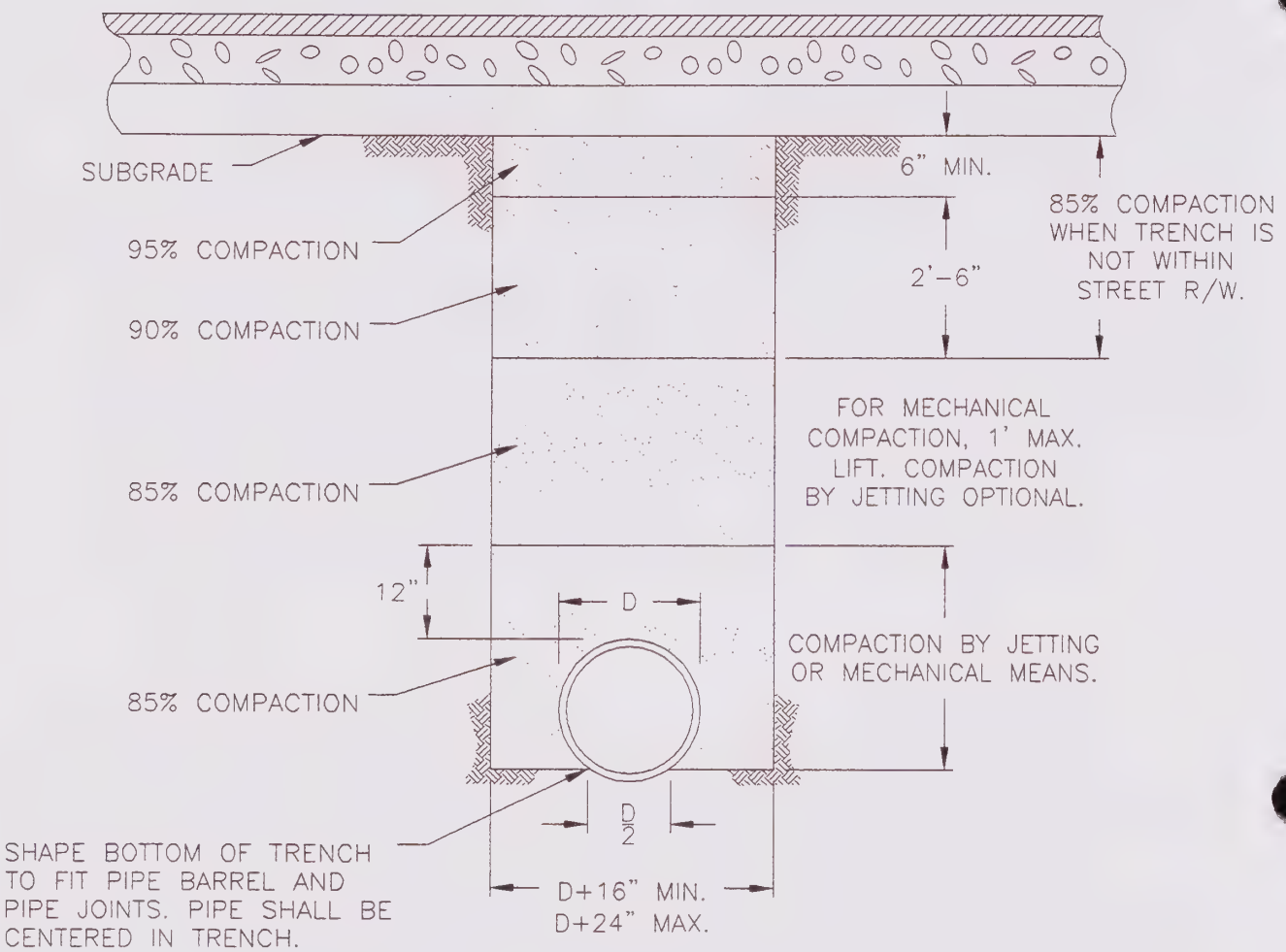
DWG. BY WW/RH	SCALE
CK. BY	NONE

MORATORIUM STREET TRENCHES
REPAIR LIMITS

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 11/25/03

SUPERCEDES DWG. DATED	DRAWING NO.
01/09/02	50E



NOTES:

1. THIS PIPE BEDDING DETAIL IS APPLICABLE TO STABLE SOIL CONDITIONS ONLY.
2. BEDDING AROUND PIPE SHALL CONFORM TO C.O.S. STD. DWG. NO. 50.
3. THIS TRENCH SECTION MAY ALSO BE USED FOR NEW STREET RIGHTS OF WAY OR EASEMENT.

REV. NO.	REV. DATE	REV. BY
4	6/1/2000	HLE/RH
DIGITIZED	1/1/92	
DWG. BY	RC	SCALE
CK. BY		NONE

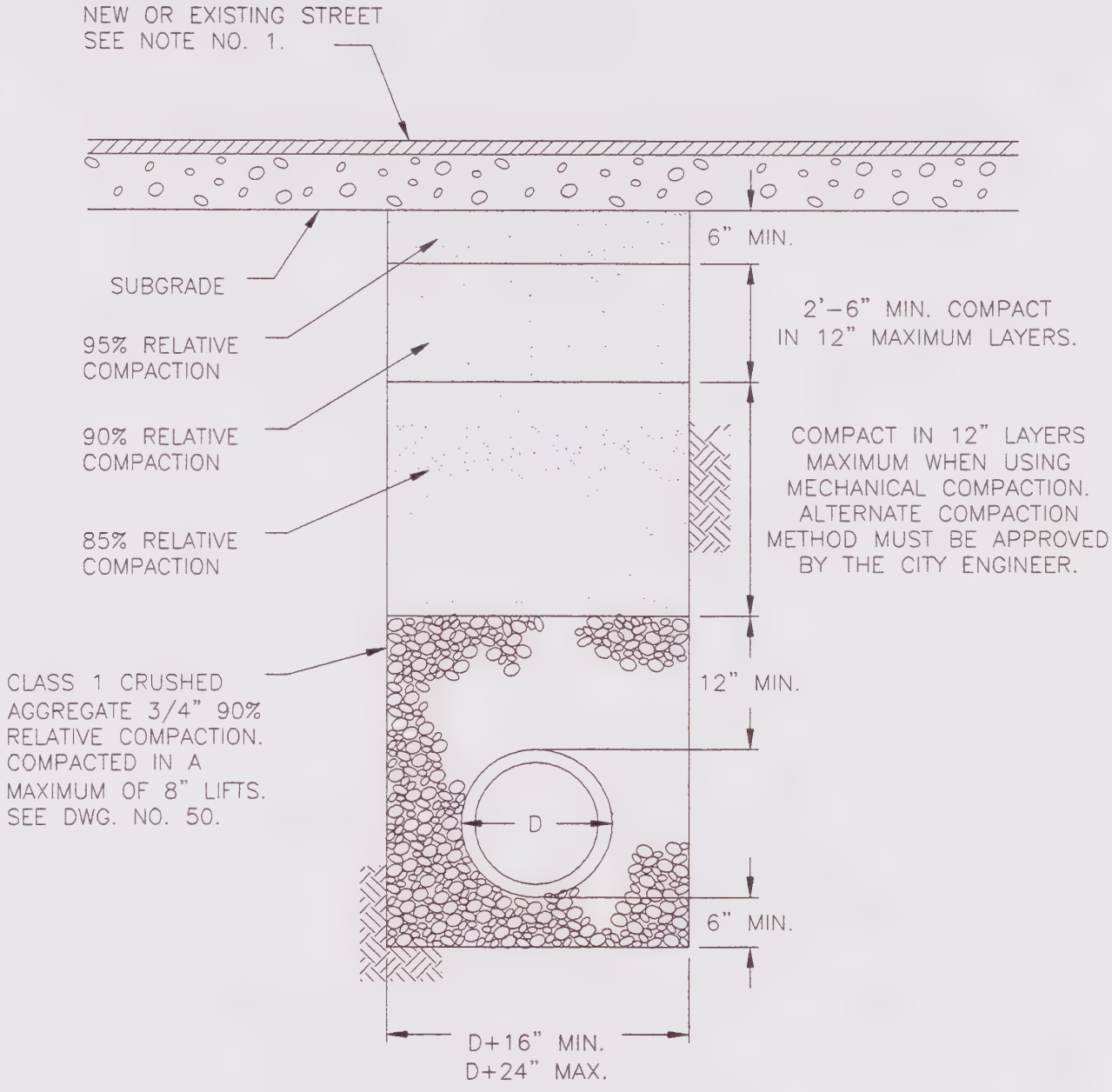
TRENCH SECTION
NEW STREETS

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 01/09/02

SUPERCEDES DWG. DATED 2/23/95

DRAWING NO. 51



NOTES:

1. IF CONSTRUCTED IN AN EXISTING STREET, THE PAVEMENT AND SUBGRADE SHALL BE SUBJECT TO THE CONDITIONS SHOWN ON STANDARD DWG. NO. 50.
2. THIS PIPE BEDDING DETAIL SUITABLE TO STABLE SOIL CONDITIONS ONLY.
3. REFER TO SECTION 71 IN THE STANDARD SPECIFICATIONS.
4. HDPE = HIGH DENSITY POLYETHYLENE PIPE.

REV. NO.	REV. DATE	REV. BY
5	6/1/2000	HLE/RH
DIGITIZED	7/1/91	
DWG. BY	RC	SCALE
CK. BY	91	NONE

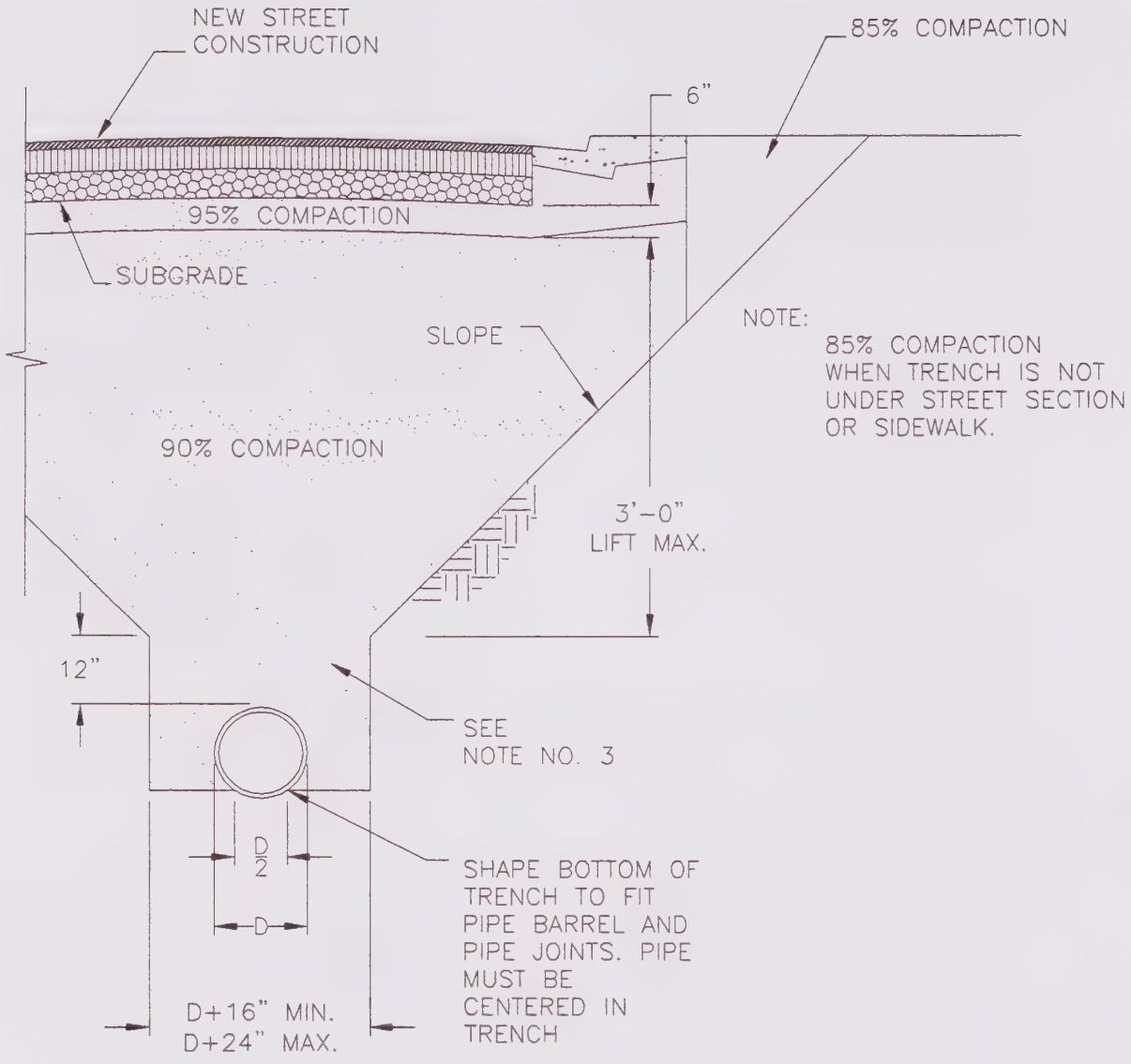
TRENCH SECTION
HDPE PIPE

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 01/09/02

SUPERCEDES DWG. DATED 2/23/95

DRAWING NO. 51A



NOTES:

1. BEDDING AROUND PIPE SHALL CONFORM TO C.O.S. STD. DWG. NO. 50.
2. THIS TRENCH SECTION MAY BE USED FOR UNIMPROVED STREET RIGHTS OF WAY OR EASEMENTS
3. MATERIAL INDICATED TO BE IMPORTED SAND OR APPROVED CLEAN GRANULAR MATERIAL, FREE OF ALL LUMPS AND DEBRIS. GRADING SHALL BE 100% PASSING A 3/4" SIEVE AND 5%-20% PASSING A #200 SIEVE WITH MINIMUM SAND EQUIVALENT EQUAL TO 20.

REV. NO.	REV. DATE	REV. BY
4	6/1/2000	HLE/RH
DIGITIZED	7/1/90	
DWG. BY RC	SCALE	
CK. BY	NONE	

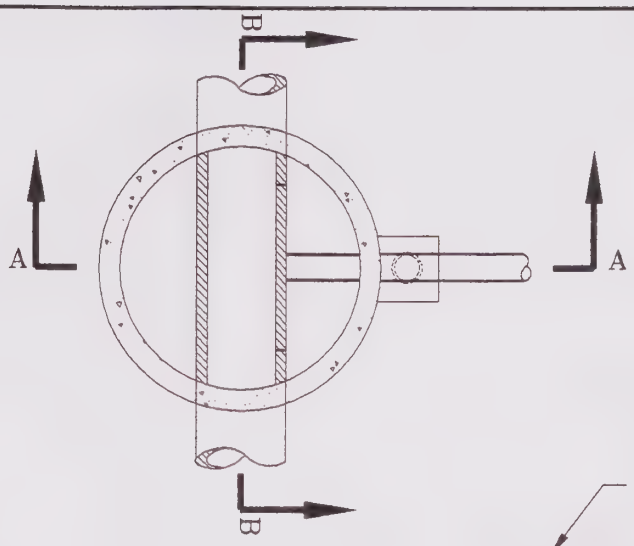
OPEN CUT TRENCH SECTION
NEW STREETS

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

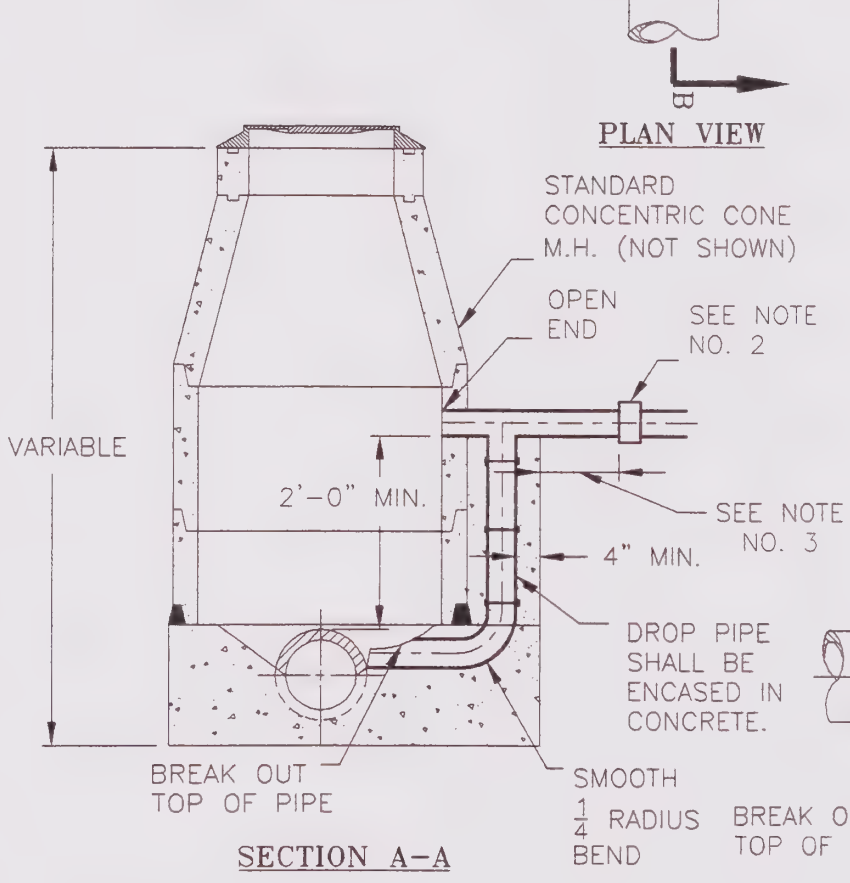
REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 01/09/02

SUPERCEDES DWG. DATED 2/23/95

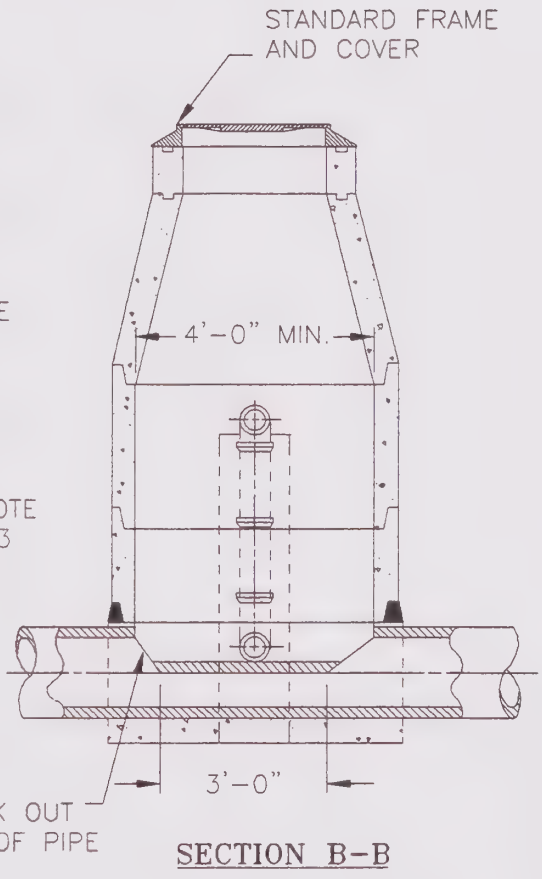
DRAWING NO. 51B



PLAN VIEW



SECTION A-A



SECTION B-B

NOTES:

1. THIS INSTALLATION SHALL BE USED ON NEW M.H. WHERE THE DIFFERENCE IN ELEVATION BETWEEN THE TOP OF THE OUTLET PIPE AND THE INVERT OF THE FEEDER OR COLLECTOR SEWER EXCEEDS 24".
2. FLEXIBLE JOINT – BELL AND SPIGOT OR CAULDER COUPLING. SOLVENT WELDED JOINT NOT PERMITTED.
3. 24" MAXIMUM.
4. THIS DETAIL SHALL ONLY BE USED FOR DROP PIPES 12" OR LESS. PIPES LARGER THAN 12" SHALL REQUIRE INDIVIDUAL DESIGN AND APPROVAL BY THE CITY ENGINEER.
5. INTERIOR OF M.H. TO BE COATED IN ACCORDANCE WITH SECTION 71-1.09 OF THE STANDARD SPECIFICATIONS.

REV. NO.	REV. DATE	REV. BY
2	6/1/2000	HLE/RH
DIGITIZED	1/1/92	
DWG. BY	RC	SCALE
CK. BY		NONE

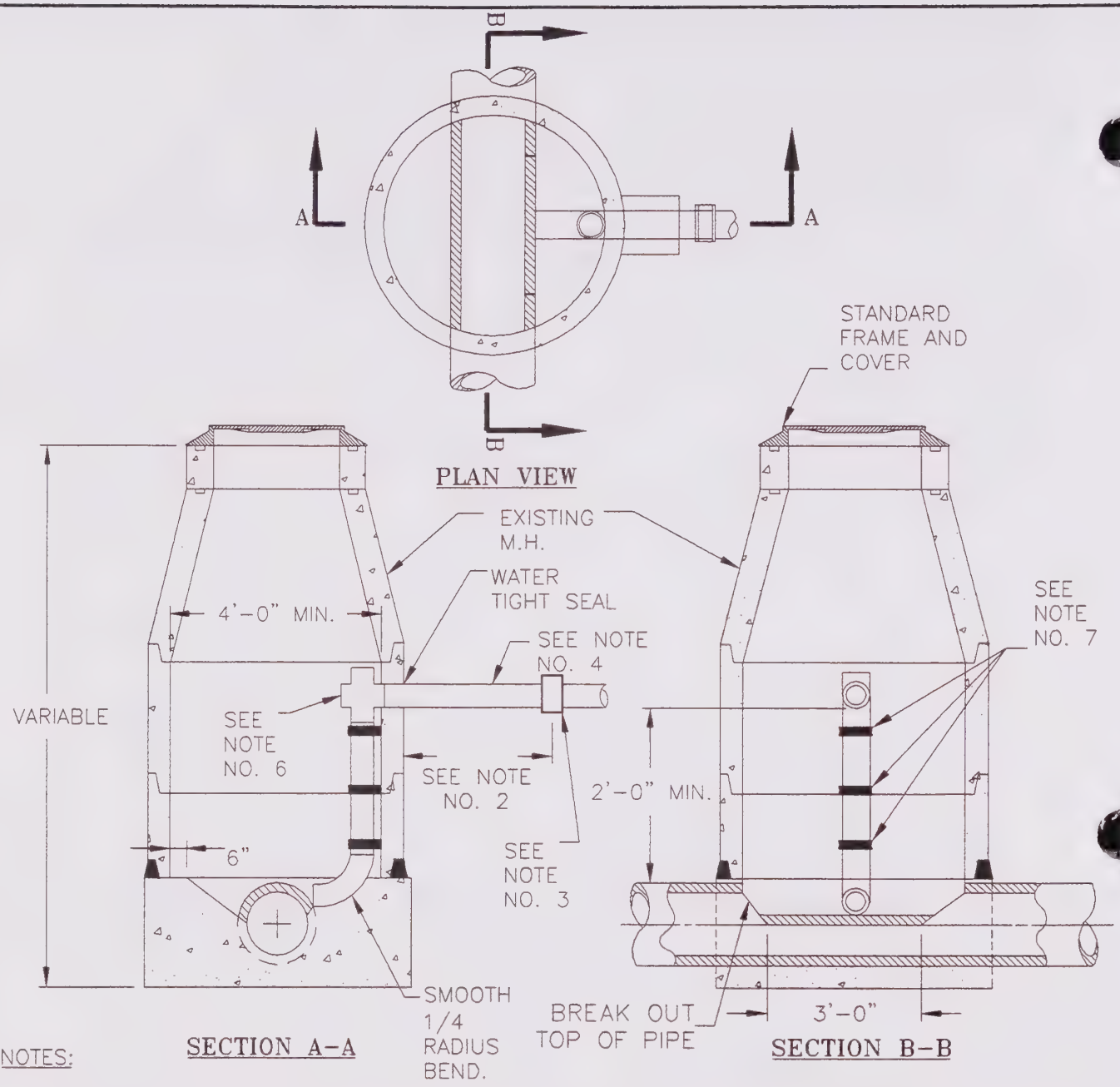
OUTSIDE SANITARY SEWER DROP IN NEW MAINTENANCE HOLE

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 01/09/02

SUPERCEDES DWG. DATED 2/23/95

DRAWING NO. 52



NOTES:

1. THIS INSTALLATION SHALL BE USED ON EXISTING M.H. WHERE THE DIFFERENCE IN ELEVATION BETWEEN THE TOP OF THE OUTLET PIPE AND THE INVERT OF THE FEEDER OR COLLECTOR SEWER EXCEED 24".
2. 24" MAXIMUM.
3. FLEXIBLE JOINT – BELL & SPIGOT OR CAULDER COUPLING. SOLVENT WELDED JOINT NOT PERMITTED.
4. THIS DETAIL SHALL ONLY BE USED FOR NEW SANITARY SEWER PIPES 12" OR LESS. PIPES LARGER THAN 12" SHALL REQUIRE SEPARATE APPROVAL BY THE CITY ENGINEER. P.V.C. OR A.B.S. PIPE MUST BE USED INSIDE M.H.
5. INTERIOR OF M.H. TO BE COATED IN ACCORDANCE WITH SECTION 71-1.09 OF THE STANDARD SPECIFICATIONS.
6. OPEN END AND CROSS FITTING.
7. STAINLESS STEEL BANDS ANCHORED WITH STAINLESS STEEL BOLTS TO WALL 24" O.C. (TWO BANDS MIN.)

REV. NO.	REV. DATE	REV. BY
3	6/1/2000	HLE/RH
DIGITIZED	1/1/92	
DWG. BY	RC	SCALE
CK. BY		NONE

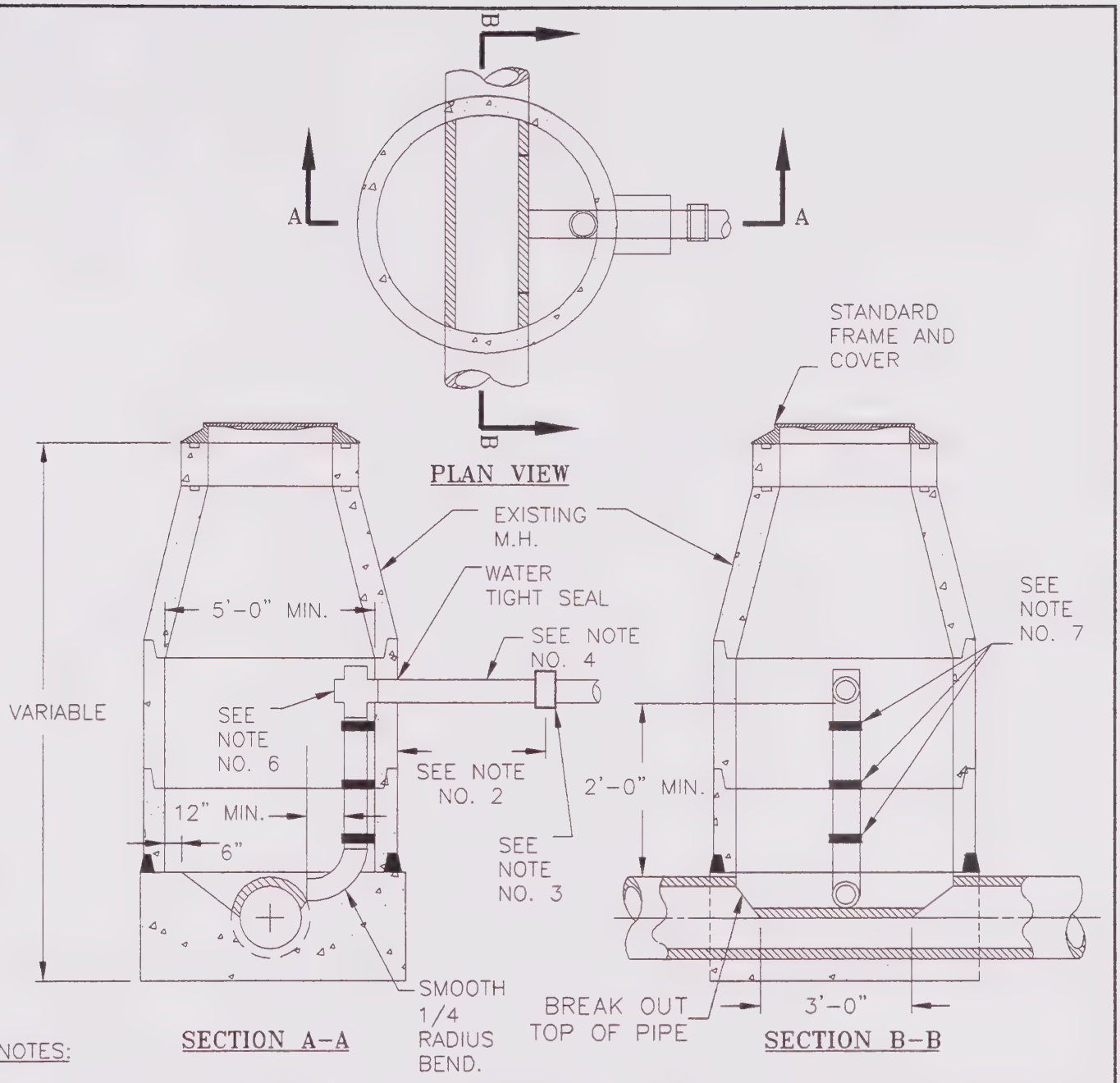
INSIDE SANITARY SEWER DROP IN EXISTING MAINTENANCE HOLE

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 01/09/02

SUPERCEDES DWG. DATED 2/23/95

DRAWING NO. 52A



NOTES:

1. THIS INSTALLATION SHALL BE USED ON NEW M.H. WHERE THE DIFFERENCE IN ELEVATION BETWEEN THE TOP OF THE OUTLET PIPE AND THE INVERT OF THE FEEDER OR COLLECTOR SEWER EXCEED 24".
2. 24" MAXIMUM.
3. FLEXIBLE JOINT – BELL & SPIGOT OR CAULDER COUPLING. SOLVENT WELDED JOINT NOT PERMITTED.
4. THIS DETAIL SHALL ONLY BE USED FOR NEW SANITARY SEWER PIPES 12" OR LESS. PIPES LARGER THAN 12" SHALL REQUIRE SEPARATE APPROVAL BY THE CITY ENGINEER. P.V.C. OR A.B.S. PIPE MUST BE USED INSIDE M.H.
5. INTERIOR OF M.H. TO BE COATED IN ACCORDANCE WITH SECTION 71-1.09 OF THE STANDARD SPECIFICATIONS.
6. OPEN END AND CROSS FITTING.
7. STAINLESS STEEL BANDS ANCHORED WITH STAINLESS STEEL BOLTS TO WALL 24" O.C. (TWO BANDS MIN.)

REV. NO.	REV. DATE	REV. BY
3	6/1/2000	HLE/RH
DIGITIZED	1/1/92	
DWG. BY RC	SCALE	
CK. BY	NONE	

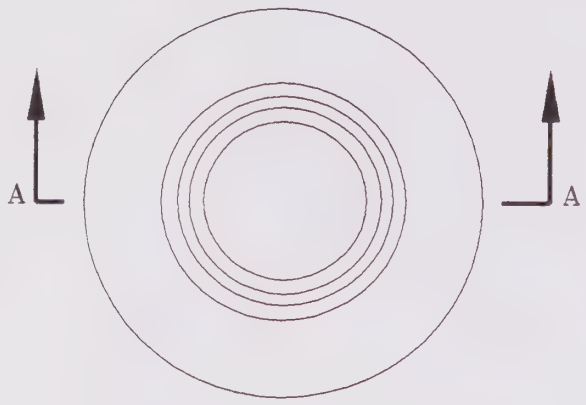
INSIDE SANITARY SEWER DROP
NEW MAINTENANCE HOLE

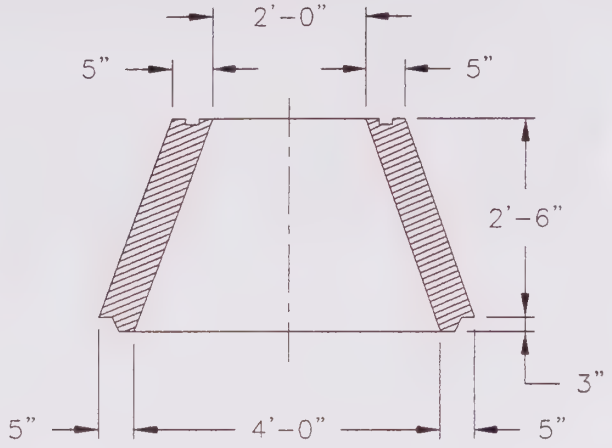
CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbarr J. O'Regan
DATE: 01/09/02

SUPERCEDES DWG. DATED 2/23/95

DRAWING NO. 52B

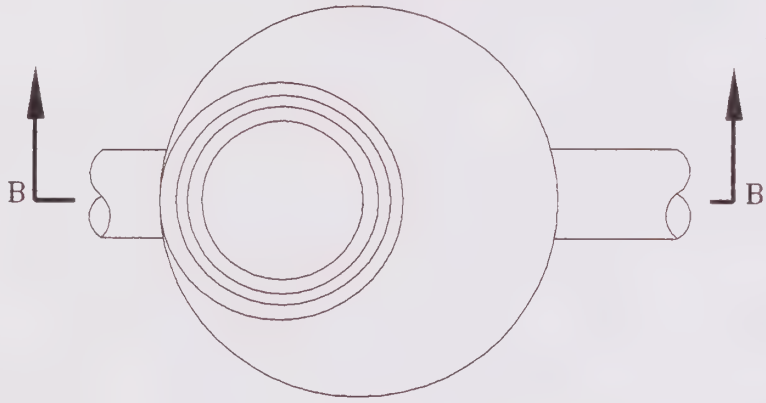


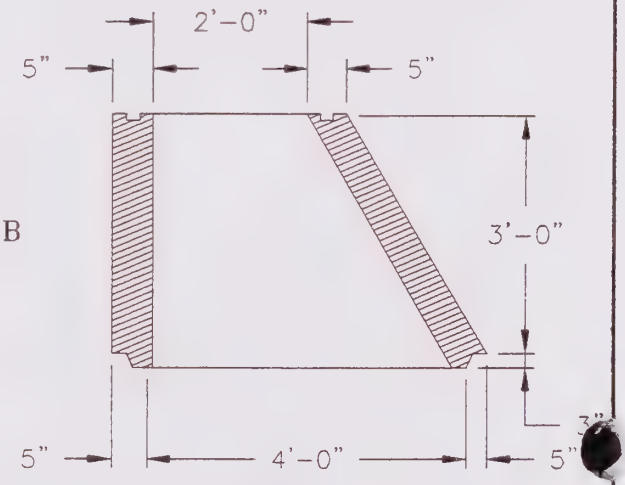


SECTION A-A

CONCENTRIC CONE

(STANDARD INSTALLATION)

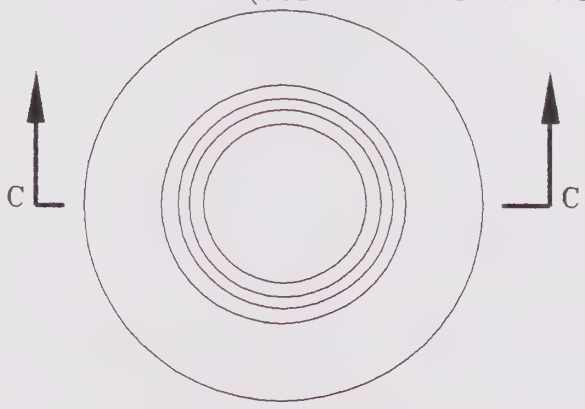


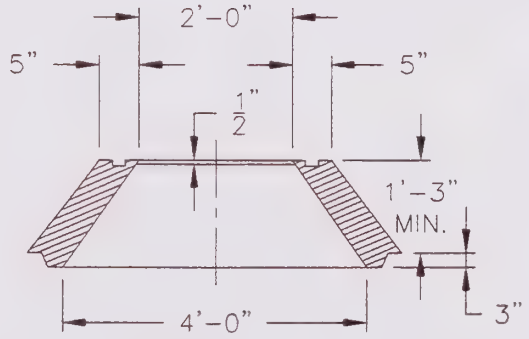


SECTION B-B

ECCENTRIC CONE

(USE WITH PRIOR APPROVAL)





SECTION C-C

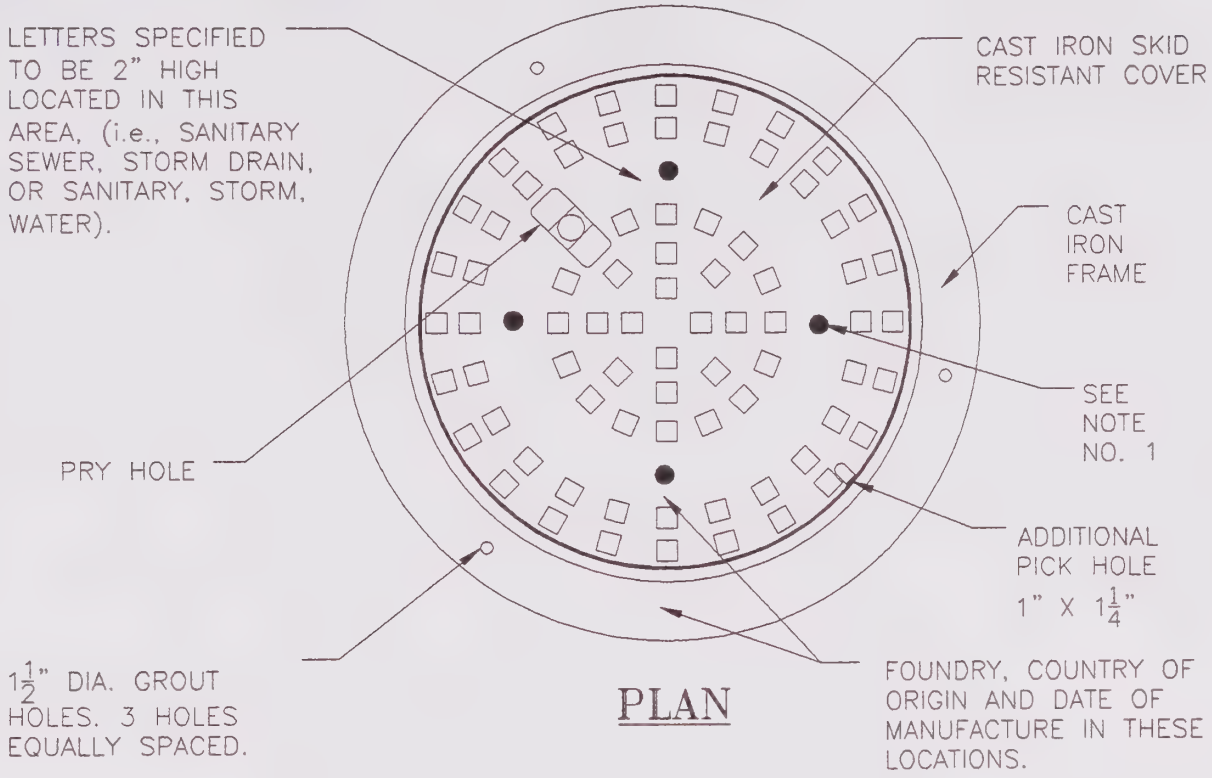
CONCENTRIC SHORT CONE

(USE WITH PRIOR APPROVAL)

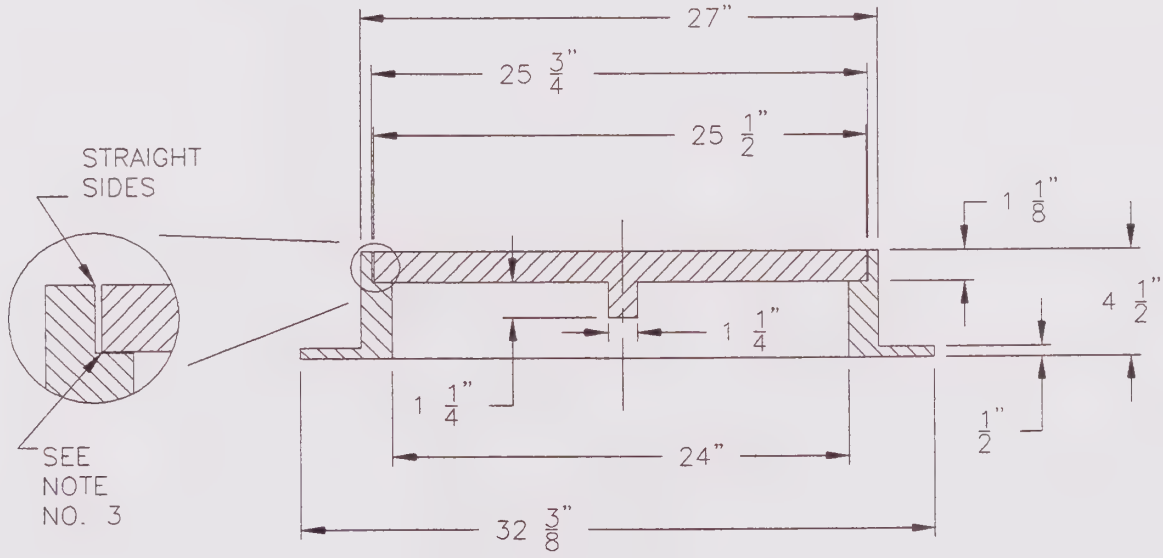
NOTES:

1. INTERIOR OF CONE TO BE COATED IN ACCORDANCE WITH SECTION 71-1.09A OF THE STANDARD SPECIFICATIONS.
2. ALL HANDLING HOLES SHALL BE PLUGGED WITH CONCRETE MORTAR AFTER CONE INSTALLATION

REV. NO.	REV. DATE	REV. BY	PRE-CAST CONCRETE MAINTENANCE HOLE CONES	REVISION APPROVED BY CITY ENGINEER Finbar J. O'Regan DATE: 01/09/02	
3	4/8/93	SA			
DIGITIZED	1/1/92				
DWG. BY RC	SCALE		CITY OF STOCKTON DEPARTMENT OF PUBLIC WORKS	SUPERCEDES DWG. DATED 11/8/80	DRAWING NO. 53
CK. BY	NONE				



PLAN



SECTION

NOTES:

1. M.H. FRAME AND COVER TO BE "PINKERTON TYPE" A-624 OR APPROVED EQUAL. M.H. COVERS FOR STORM DRAIN SHALL HAVE 4 VENT HOLES CORED IN THE COVER.
2. COVER SHALL BE DESIGNED TO WITHSTAND HS-20 HIGHWAY LOADING.
3. FRAME AND COVER SHALL BE FULLY MACHINED TO ASSURE INTERCHANGEABILITY AND A CLOSE, QUIET FIT.
4. SEE SECTION 75-1.02A. OF THE STANDARD SPECIFICATIONS.

REV. NO.	REV. DATE	REV. BY
6	6/1/2003	HL/EA
DIGITIZED	7/1/90	
DWG. BY RC	SCALE	
CK. BY	NONE	

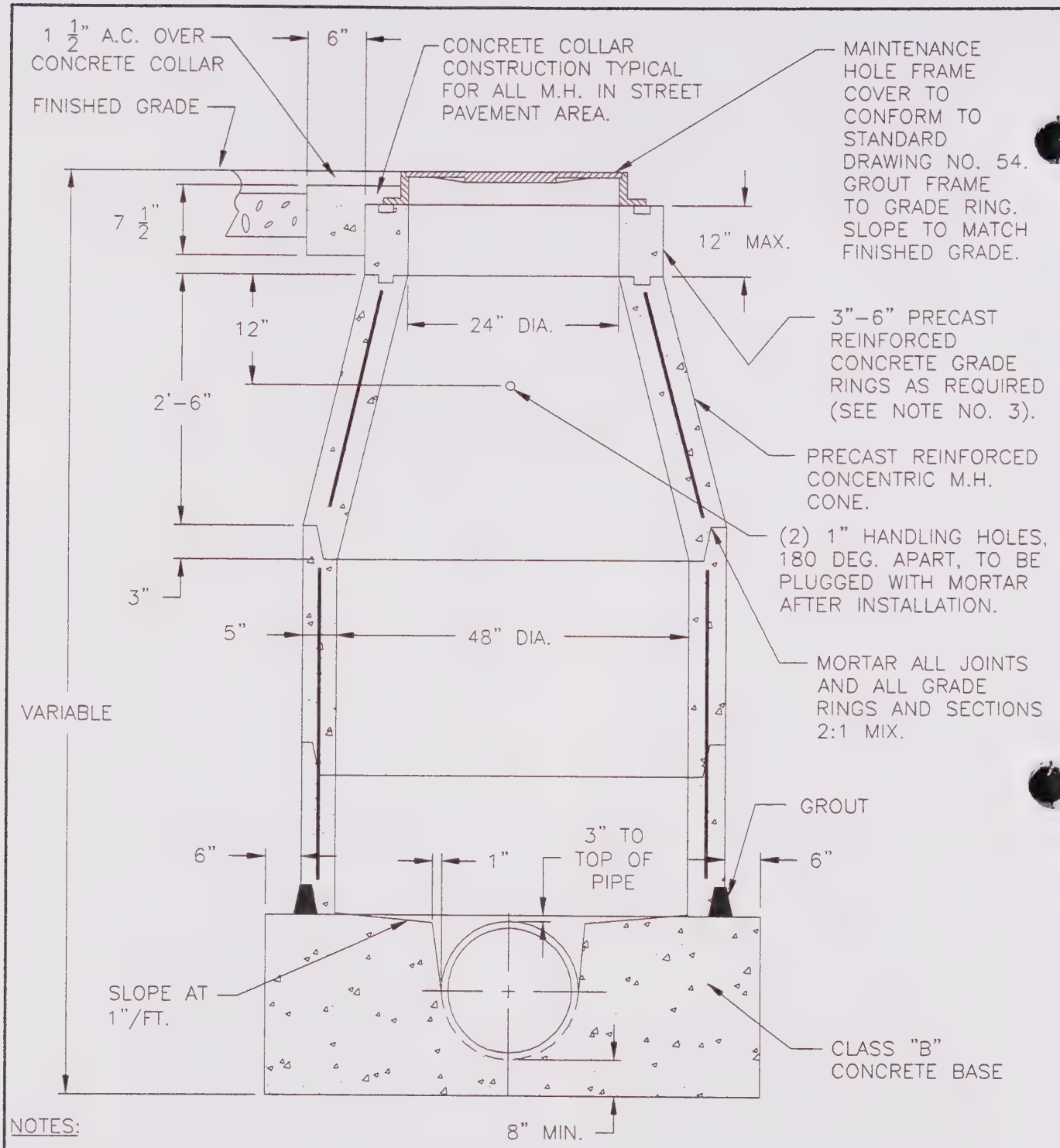
MAINTENANCE HOLE FRAME AND COVER

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 11/25/03

SUPERCEDES DWG. DATED 01/09/02

DRAWING NO. 54



NOTES:

1. PRECAST CONCRETE M.H. UNITS SHALL CONFORM TO A.S.T.M. C–478.
2. CONSTRUCT PIPE STUB JOINT, 2'–0" MINIMUM TO 12'–0" MAXIMUM FOR PVC PIPE AND 2'–0" MAXIMUM FOR RIGID PIPE FROM BASE OF M.H.
3. PRIOR APPROVAL FROM THE CITY ENGINEER MUST BE OBTAINED BEFORE INSTALLING MORE THAN 12" OF GRADE RINGS.
4. FOR TYPICAL PIPE INTERSECTION DETAIL SEE DRAWING NO. 78.
5. INTERIOR OF SANITARY SEWER M.H. SHALL BE COATED IN ACCORDANCE WITH SECTION 71–1.09 OF THE STANDARD SPECIFICATIONS.

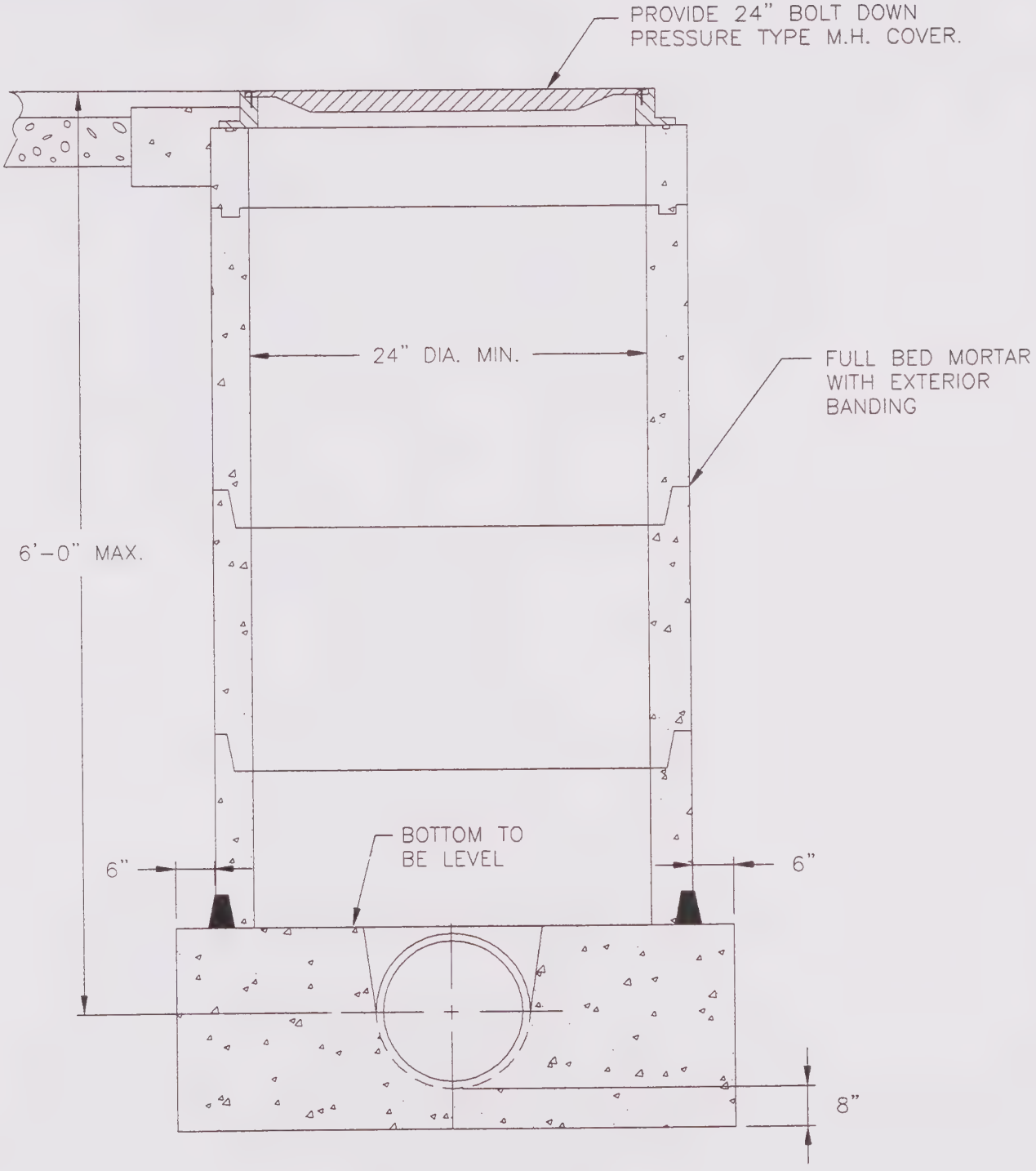
REV. NO.	REV. DATE	REV. BY
4	6/1/2003	HL/EA
DIGITIZED	1/1/92	
DWG. BY	RC	SCALE
CK. BY		NONE

TYPE 1 MAINTENANCE HOLE FOR PIPES 33" DIAMETER OR SMALLER

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 11/25/03

SUPERCEDES DWG. DATED	DRAWING NO.
01/09/02	55



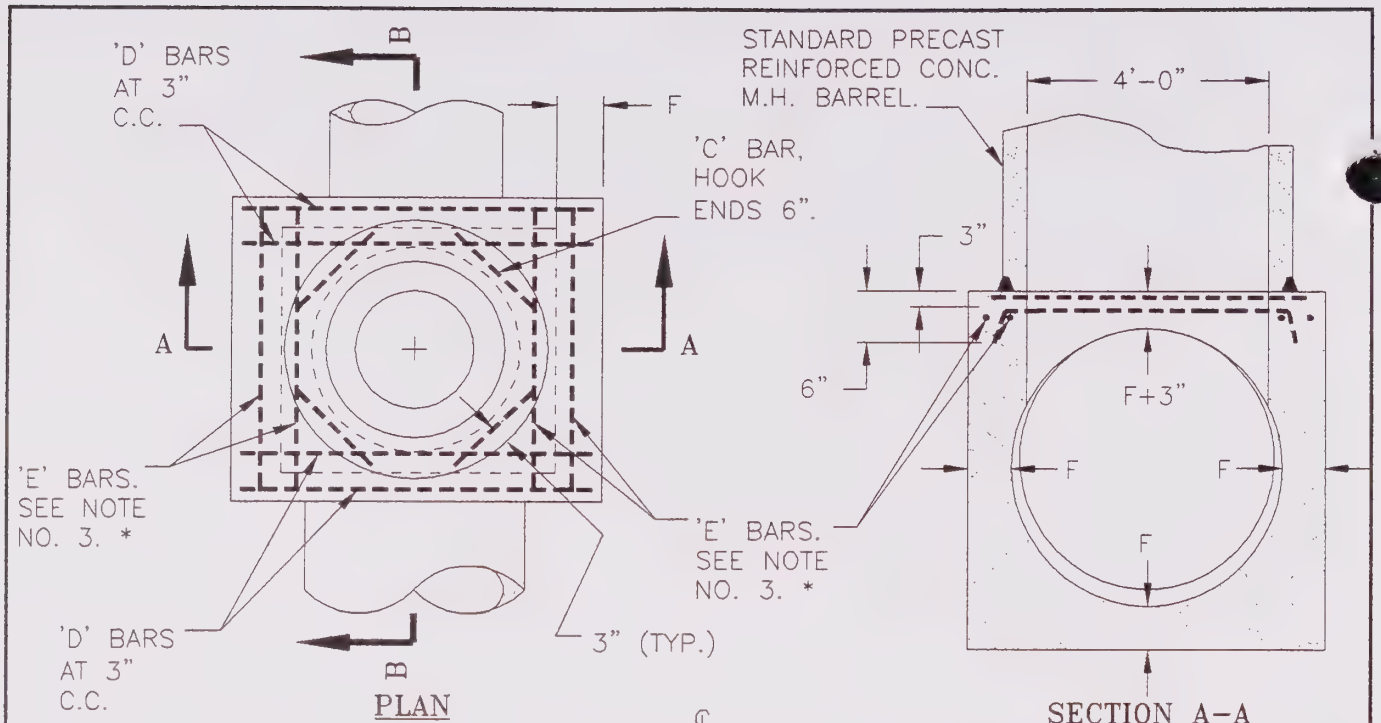
REV. NO.	REV. DATE	REV. BY
3	6/1/2000	HLE/RH
DIGITIZED	1/1/92	
DWG. BY	RC	SCALE
CK. BY		NONE

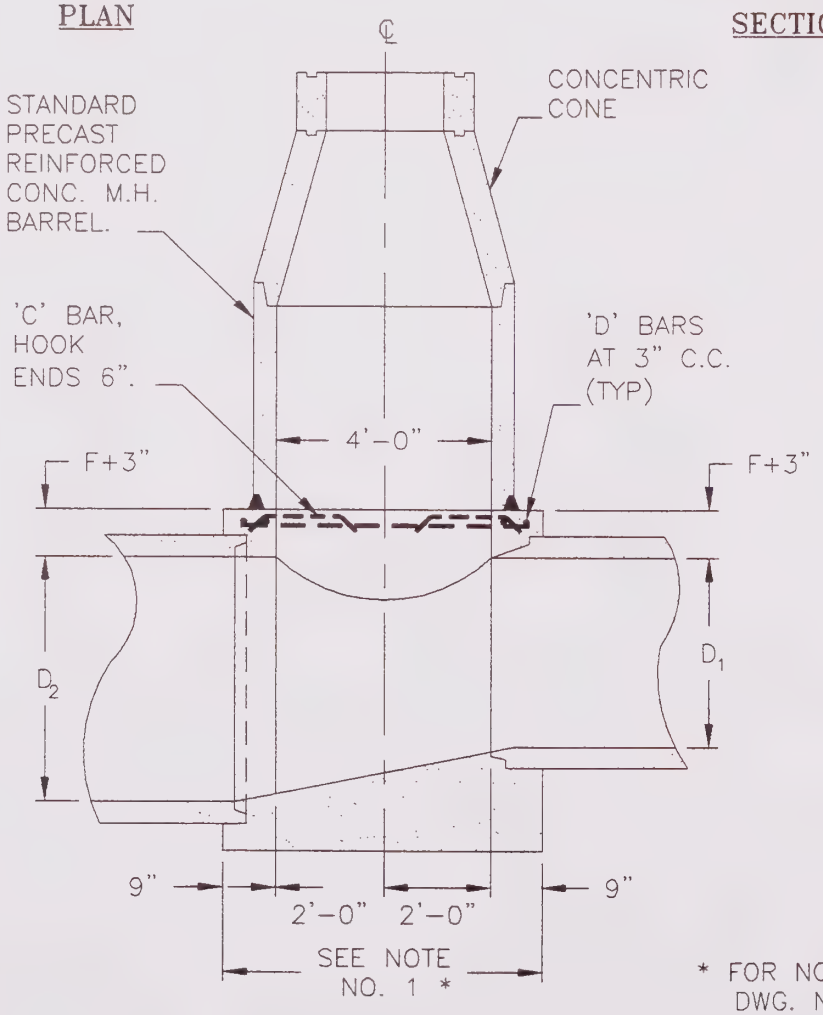
PRETREATMENT SAMPLING STATION HOLE--ONSITE ONLY

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

NEW DRAWING APPROVED BY CITY ENGINEER
Finbarr J. O'Regan
DATE: 01/09/02

SUPERCEDES DWG. DATED	DRAWING NO.
6/1/94	55A





SECTION B-B

* FOR NOTES, SEE DWG. NO. 56A.

REV. NO.	REV. DATE	REV. BY	TYPE 2 MAINTENANCE HOLE FOR PIPES 36" DIA. AND LARGER	REVISION APPROVED BY CITY ENGINEER Finbar J. O'Regan DATE: 01/09/02	
4	6/1/2000	HLE/RH			
DIGITIZED	1/1/92				
DWG. BY HLE	SCALE		CITY OF STOCKTON DEPARTMENT OF PUBLIC WORKS	SUPERCEDES DWG. DATED 2/23/95	DRAWING NO. 56
CK. BY	NONE				

(CONT'D FROM DWG. 56)

TABLE VALUES FOR 'F'			
D_2	'F'	D_2	'F'
36"	11"	63"	10"
39"	10"	66"	10 1/4"
42"	8 3/4"	69"	10 3/4"
45"	7 3/4"	72"	11"
48"	8"	78"	11 3/4"
51"	8 1/2"	84"	12 1/2"
54"	9"	90"	13 1/4"
57"	9 1/4"	96"	14"
60"	9 1/2"		

(SEE DRAWING NO. 56B, 56C FOR ADDITIONAL DETAILS)

NOTES:

1. LENGTH SHALL BE 5'-6" UNLESS OTHERWISE SHOWN ON THE IMPROVEMENT PLANS.
2. THICKNESS OF DECK SHALL VARY WHEN NECESSARY TO PROVIDE LEVEL SEAT FOR M.H. BARREL.
3. REINFORCING STEEL SHALL BE ROUND, DEFORMED BARS, 2" CLEAR MINIMUM FROM FACE OF CONCRETE. SIZES AND LENGTH ARE SHOWN IN TABLE ON DRAWING 56C.
4. CONCRETE SHALL BE 3000 LBS. PER SQ. INCH MINIMUM AT 28 DAYS.
5. RINGS, REDUCERS, AND M.H. BARRELS FOR ACCESS SHAFT SHALL BE SEATED IN CONCRETE. MORTAR COMPOSED OF ONE PART CEMENT TO 1-1/2" PARTS SAND BY VOLUME AND NEATLY POINTED OR WIPED INSIDE THE SHAFT.
6. FLOOR OF M.H. SHALL BE STEEL TROWELED TO SPRING LINE.
7. BASE OF M.H. SHALL BE POURED IN ONE CONTINUOUS OPERATION, EXCEPT THAT THE CONTRACTOR SHALL HAVE THE OPTION OF PLACING A CONSTRUCTION JOINT AT THE SPRING LINE, WITH A LONGITUDINAL KEYWAY.
8. INTERIOR OF SANITARY SEWER M.H.'S SHALL BE COATED IN ACCORDANCE WITH SECTION 71-1.09 OF THE STANDARD SPECIFICATIONS.
9. M.H. STATIONING ON IMPROVEMENT PLAN SHALL BE TO THE CENTER OF M.H.

REV. NO.	REV. DATE	REV. BY
4	6/1/2000	HLE/RH
DIGITIZED	1/1/92	
DWG. BY RC	SCALE	
CK. BY	NONE	

TYPE 2 MAINTENANCE HOLE FOR PIPES 36" DIA. AND LARGER

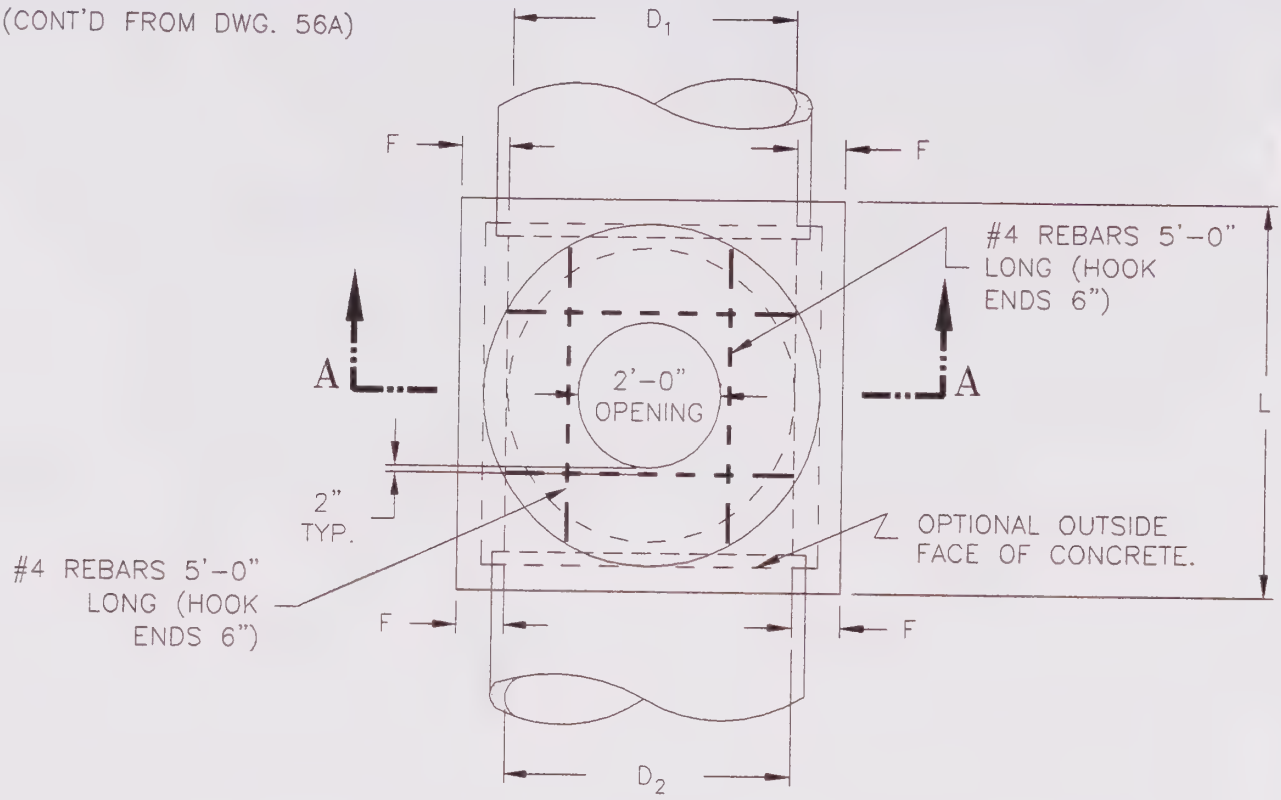
CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 01/09/02

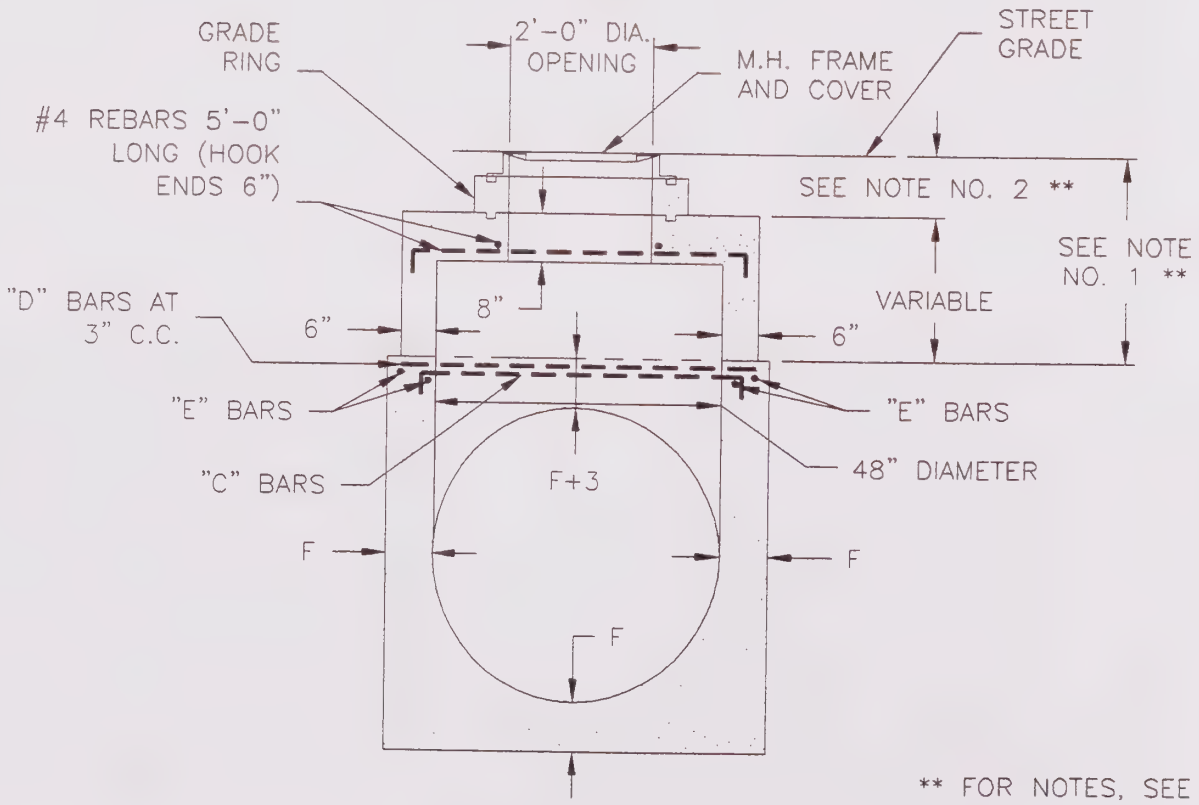
SUPERCEDES DWG. DATED 2/23/95

DRAWING NO. 56A

(CONT'D FROM DWG. 56A)



PLAN



SECTION A-A

** FOR NOTES, SEE DWG. NO. 56C.

REV. NO.	REV. DATE	REV. BY
4	6/1/2000	HLE/RH
DIGITIZED	1/1/92	
DWG. BY RC	SCALE	
CK. BY	NONE	

TYPE 2 MAINTENANCE HOLE FOR PIPES 36" DIA. AND LARGER

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 01/09/02

SUPERCEDES DWG. DATED 2/23/95

DRAWING NO. 56B

(CONT'D FROM DWG. 56B)

NOTES:

1. WHEN DEPTH OF MAINTENANCE HOLE FROM STREET GRADE TO TOP OF BOX IS LESS THAN 2'–10.5" FOR PAVED STREETS OR 3'–6" FOR UNPAVED STREETS. CONSTRUCT MONOLITHIC SHAFT AS SHOWN. THE CONTRACTOR SHALL HAVE THE OPTION OF CONSTRUCTING SHAFT AS SHOWN FOR ANY DEPTH OF MAINTENANCE HOLE.

2. PER SECTION A–A ABOVE, IN PAVED STREETS THE MAXIMUM HEIGHT SHALL BE 10.5" AND THE MINIMUM HEIGHT 7.5"; IN UNPAVED STREETS THE MAXIMUM HEIGHT SHALL BE 16.5" AND THE MINIMUM HEIGHT 13.5".

REINFORCING STEEL FOR M.H. BOX

D_2	'C' BAR 45°–45° HOOK ENDS 6"			'D' BAR ———			'E' BAR ———		
DIA.	NO.REQ'D	SIZE	LENGTH	NO.REQ'D	SIZE	LENGTH	NO.REQ'D	SIZE	LENGTH
36"	2	# 4	6'–4"	4	# 4	4'–6"	2	# 4	5'–2"
39"	2	# 4	6'–4"	4	# 4	4'–7"	2	# 4	5'–2"
42"	2	# 4	6'–4"	4	# 5	4'–7 1/2"	2	# 4	5'–2"
45"	2	# 4	6'–4"	4	# 5	4'–8 1/2"	2	# 4	5'–2"
48"	2	# 4	6'–4"	4	# 5	5'–0"	4	# 4	5'–2"
51"	2	# 4	6'–4"	4	# 5	5'–4"	4	# 4	5'–2"
54"	2	# 4	6'–4"	4	# 5	5'–8"	4	# 4	5'–2"
57"	2	# 4	6'–4"	4	# 5	5'–11 1/2"	4	# 4	5'–2"
60"	2	# 4	6'–4"	4	# 5	6'–3"	4	# 4	5'–2"
63"	2	# 4	6'–4"	4	# 5	6'–7"	4	# 4	5'–2"
66"	2	# 4	6'–4"	4	# 5	6'–10 1/2"	4	# 4	5'–2"
69"	2	# 4	6'–4"	4	# 5	7'–2 1/2"	4	# 4	5'–2"
72"	2	# 4	6'–4"	4	# 5	7'–6"	4	# 4	5'–2"
78"	2	# 4	6'–4"	4	# 5	8'–1 1/2"	4	# 4	5'–2"
84"	2	# 4	6'–4"	4	# 5	8'–9"	4	# 4	5'–2"
90"	2	# 4	6'–4"	4	# 6	9'–4 1/2"	4	# 4	5'–2"
96"	2	# 4	6'–4"	4	# 6	10'–0"	4	# 4	5'–2"

3. INTERIOR OF SANITARY SEWER MAINTENANCE HOLE SHALL BE COATED IN ACCORDANCE WITH SECTION 71–1.09 OF THE STANDARD SPECIFICATIONS.

REV. NO.	REV. DATE	REV. BY
4	6/1/2000	HLE/RH
DIGITIZED	1/1/92	
DWG. BY	RC	SCALE
CK. BY		NONE

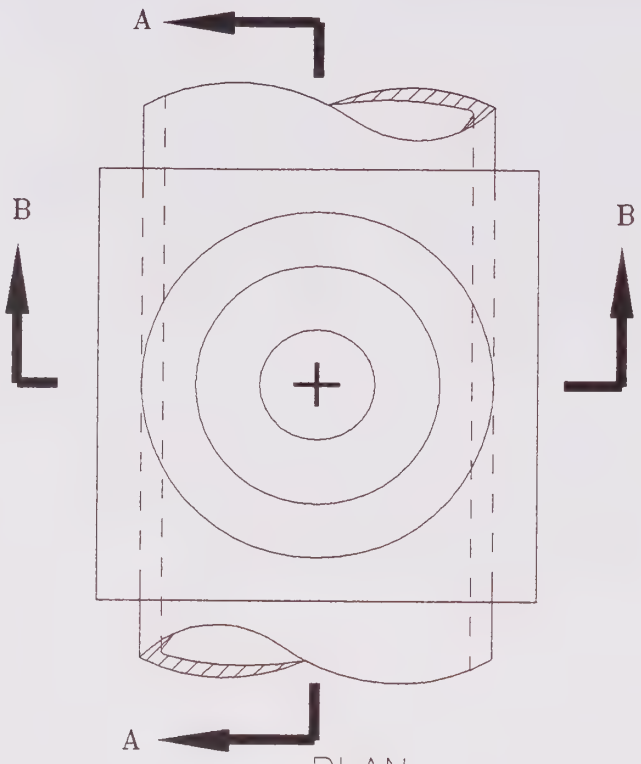
TYPE 2 MAINTENANCE HOLE FOR PIPES 36" DIA. AND LARGER

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

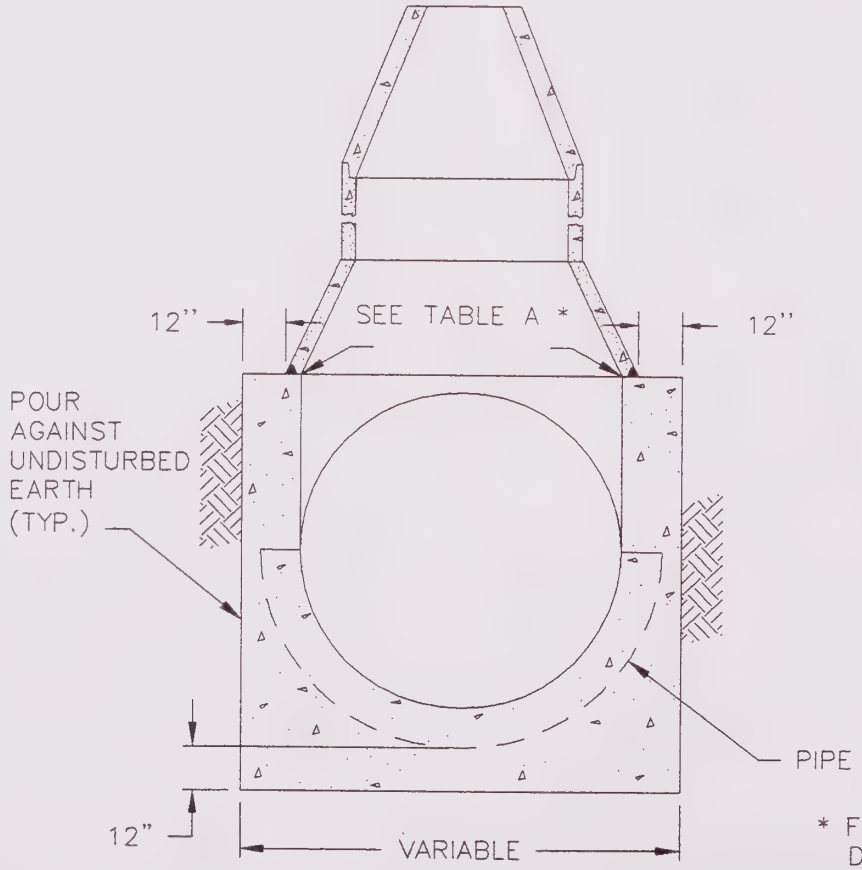
REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 01/09/02

SUPERCEDES DWG. DATED 2/23/95

DRAWING NO. 56C



PLAN



* FOR TABLE A, SEE DWG. NO. 57A.

REV. NO.	REV. DATE	REV. BY
2	2/23/95	KB/DE
DIGITIZED	1/1/92	
DWG. BY	RC	SCALE
CK. BY		NONE

TYPE 3 MAINTENANCE HOLE FOR PIPES 36" DIA. AND LARGER

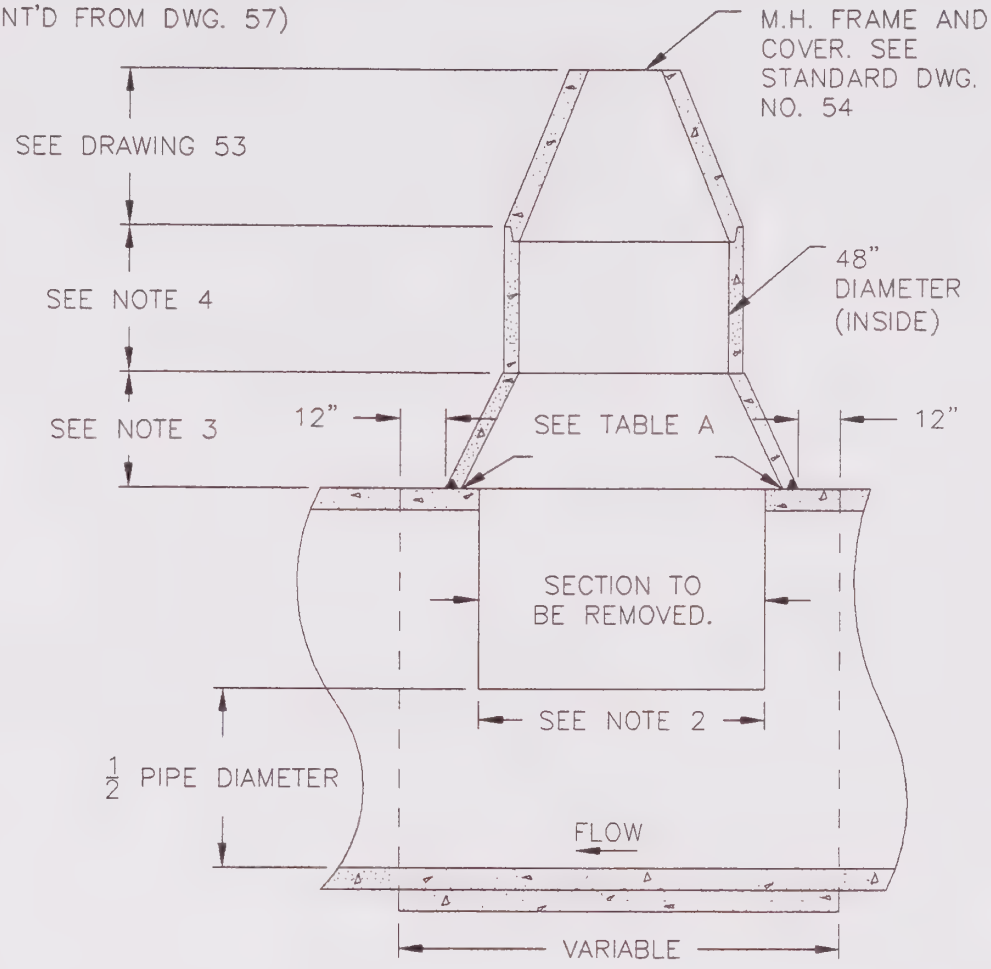
CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 01/09/02

SUPERCEDES DWG. DATED 12/31/80

DRAWING NO. 57

(CONT'D FROM DWG. 57)



SECTION A–A

	TABLE A		
PIPE DIAMETER	36" THRU 39"	42" THRU 48"	54" THRU 72"
CONE DIAMETER	48"	60"	72"

NOTES:

1. ALL CONE SECTIONS TO CONFORM TO A.S.T.M. C–478.
2. MAINTENANCE HOLE TO BE PLACED SUCH THAT EXISTING, OR CAST IN PLACE PIPE, RUNS STRAIGHT THROUGH, BREAK OUT TOP OF PIPE TO A LENGTH EQUAL TO THE PIPE DIAMETER TO PIPE SPRING LINE.
3. INSTALL CONCENTRIC PRE CAST CONCRETE CONE.
4. IF REQUIRED, INSTALL STANDARD 48" PRE CAST CONCRETE VERTICAL SECTIONS TO MEET GRADE.
5. CONSTRUCT FLEXIBLE PIPE JOINTS AT 2'–0" MAX. FROM BASE OF M.H.
6. GROUT ALL M.H. JOINTS WITH 2 : 1 MIX MORTAR.
7. INTERIOR OF SANITARY SEWER M.H. TO BE COATED IN ACCORDANCE WITH SECTION 71–1.09 OF THE STANDARD SPECIFICATIONS.

REV. NO.	REV. DATE	REV. BY
2	2/23/95	KB/DE
DIGITIZED	1/1/92	
DWG. BY RC	SCALE	
CK. BY	NONE	

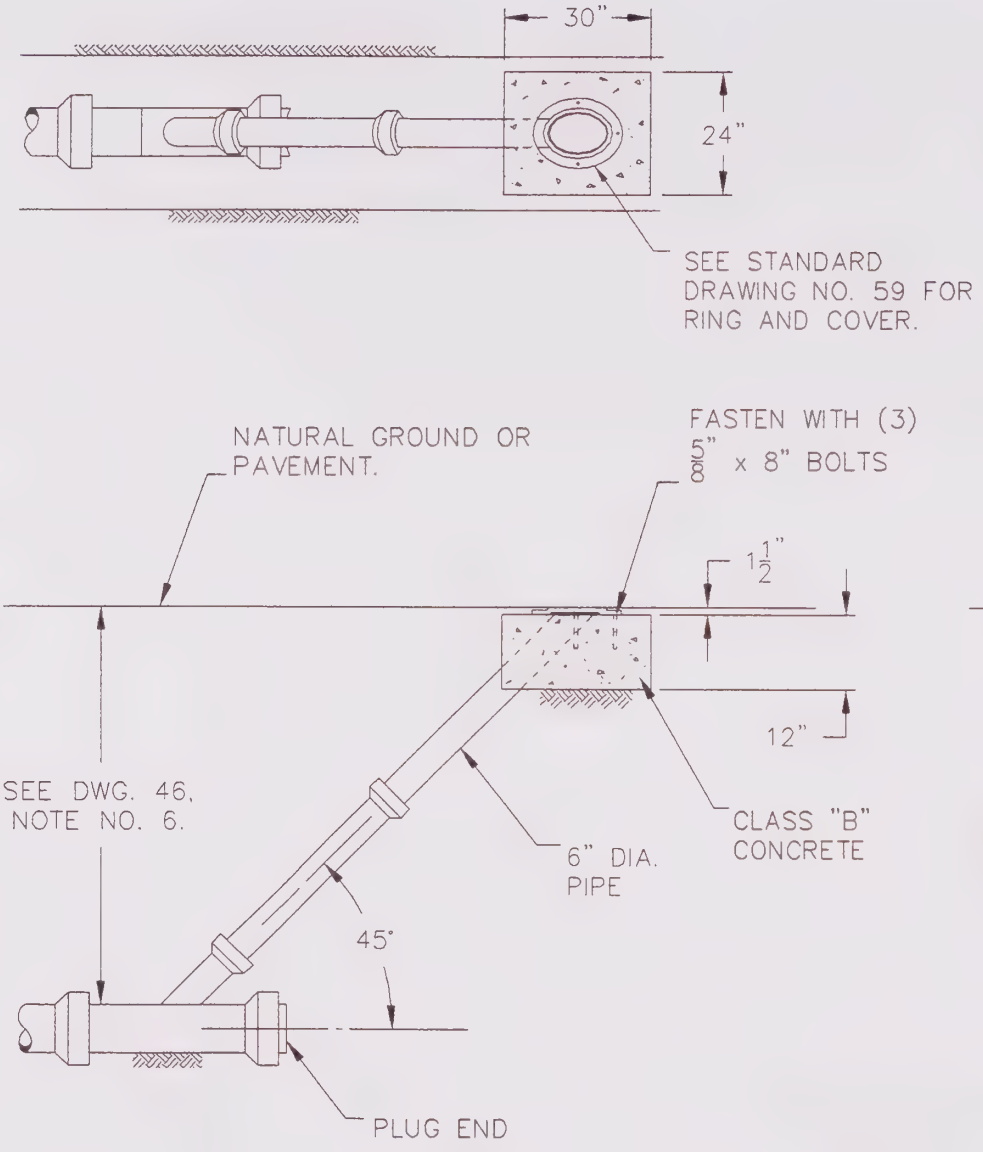
TYPE 3 MAINTENANCE HOLE FOR PIPES 36" DIA. AND LARGER

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 01/09/02

SUPERCEDES DWG. DATED 12/31/80

DRAWING NO. 57A



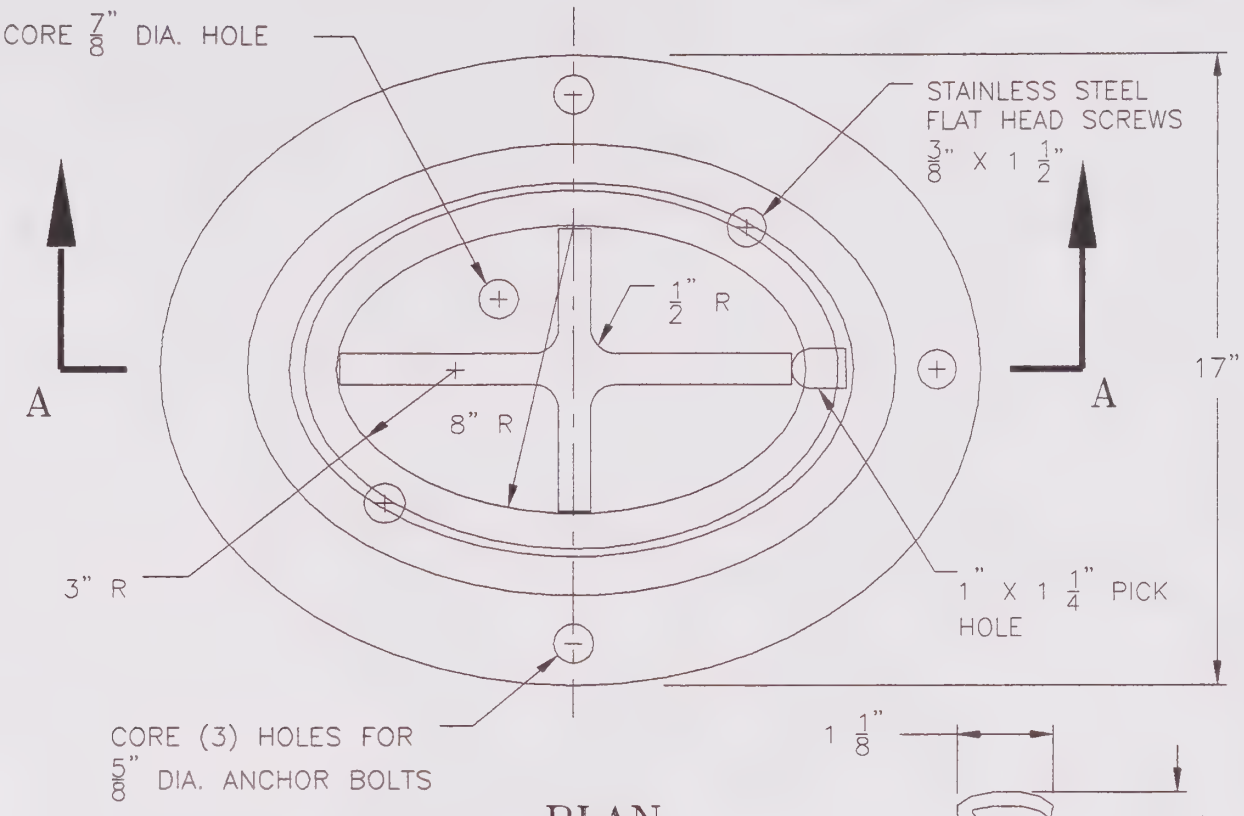
ELEVATION

END VIEW

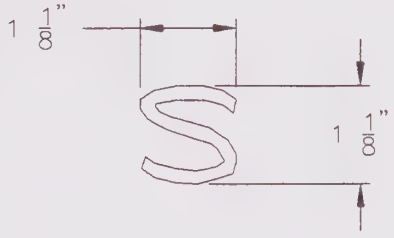
NOTE:

LAMPHOLE MAY BE INSTALLED AT END OF SANITARY SEWER LINES ONLY WITH APPROVAL FROM THE CITY ENGINEER.

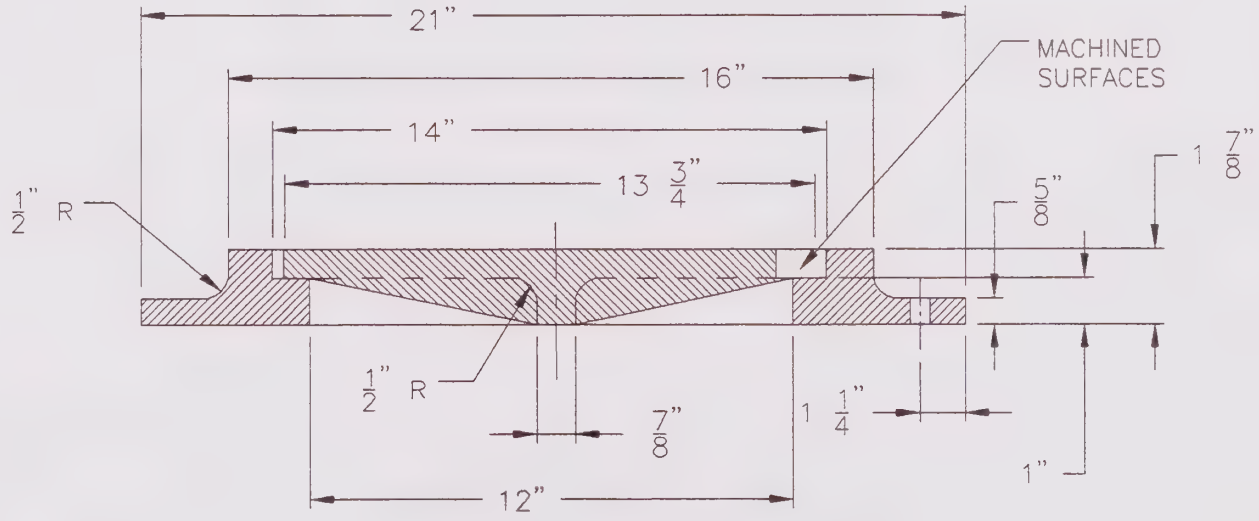
REV. NO.	REV. DATE	REV. BY	LAMPHOLE	REVISION APPROVED BY CITY ENGINEER
5	6/1/2000	HLE/RH		Finbar J. O'Regan
DIGITIZED	1/1/92			DATE: 01/09/02
DWG. BY RC	SCALE		CITY OF STOCKTON	SUPERCEDES DWG. DATED
CK. BY	NONE		DEPARTMENT OF PUBLIC WORKS	2/3/95
				DRAWING NO. 58



PLAN



LETTER "S" PLACED AT CENTER OF COVER



SECTION A–A

NOTE:

USE SOUTH BAY FOUNDRY NO. (B26) SBF 142 WITH STAINLESS STEEL BOLT DOWN SCREWS OR EQUAL.

REV. NO.	REV. DATE	REV. BY
1	6/1/2003	HL/EA
DIGITIZED	1/1/92	
DWG. BY RC	SCALE	
CK. BY	NONE	

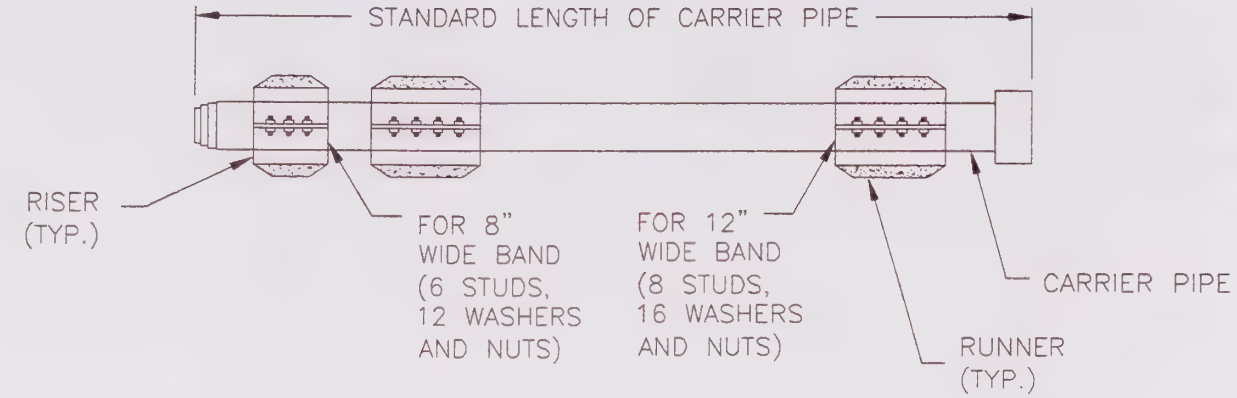
LAMPHOLE
RING & COVER

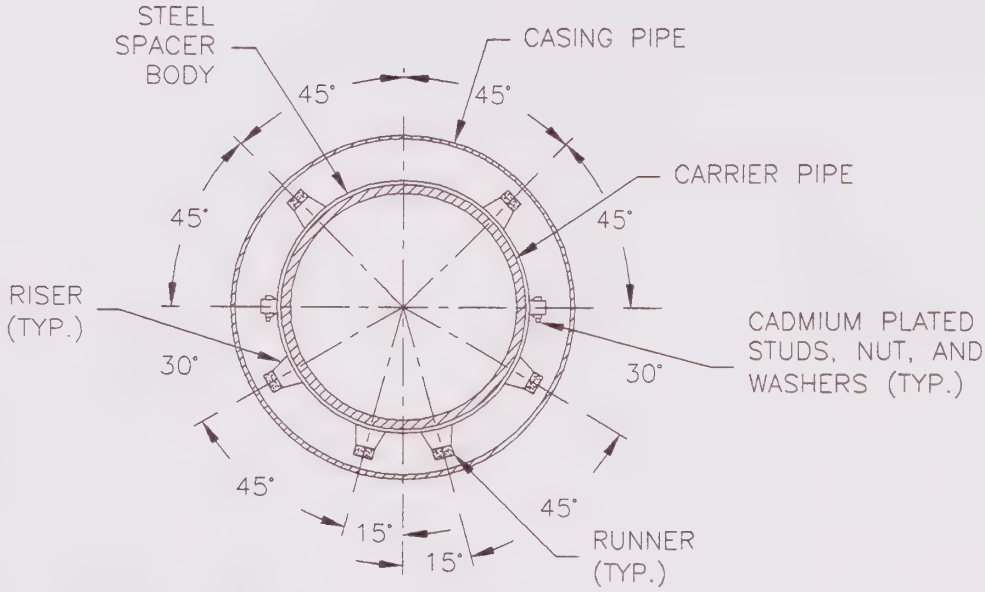
CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 11/25/03

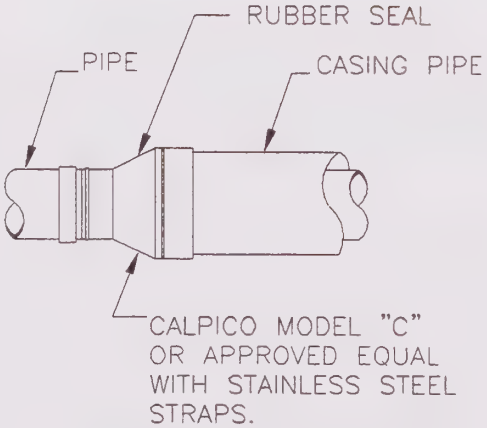
SUPERCEDES DWG. DATED 01/09/02

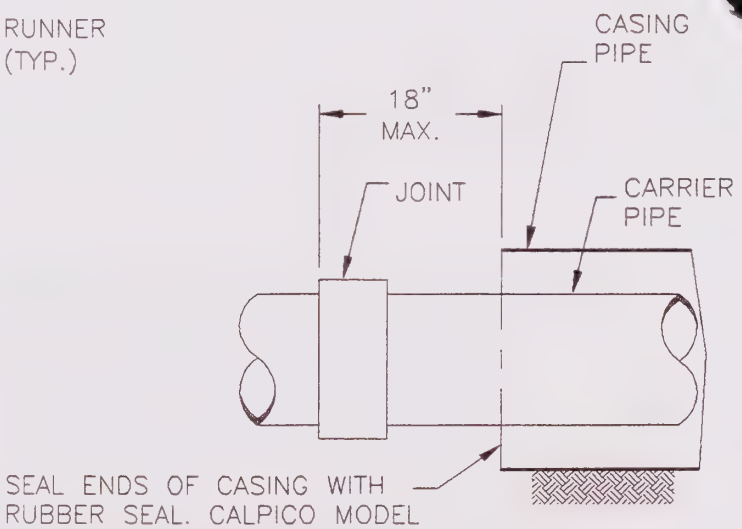
DRAWING NO. 59





CASING SPACERS





FOR NOTES, SEE DWG. NO. 60A.

REV. NO.	REV. DATE	REV. BY		
3	6/1/2003	HL/EA	JACKING DETAILS FOR PIPES	REVISION APPROVED BY CITY ENGINEER Finbar J. O'Regan DATE: 11/25/03
DIGITIZED	1/1/92			
DWG. BY RC	SCALE		CITY OF STOCKTON DEPARTMENT OF PUBLIC WORKS	SUPERCEDES DWG. DATED 01/09/02
CK. BY	NONE			DRAWING NO. 60

(CONT'D FROM DWG. 60)

STEEL CASING SCHEDULE		
PIPE SIZE & TYPE	CASING	THICK
6" VITRIFIED CLAY	14" I.D.	$\frac{3}{16}$"
8" VITRIFIED CLAY	16" I.D.	$\frac{1}{4}$"
10" VITRIFIED CLAY	20" I.D.	$\frac{1}{4}$"
12" VITRIFIED CLAY	22" I.D.	$\frac{1}{4}$"

NOTES:

1. CASING SHALL BE INSTALLED BY THE JACKING AND BORING METHOD.
2. CASING JOINTS SHALL BE WELDED IN ACCORDANCE WITH AWWA STANDARD C-206 EXCEPT THAT HYDROSTATIC TESTING WILL NOT BE REQUIRED.
3. CASING SPACERS SHALL BE PROVIDED AS PER DETAIL (SEE DRAWING NO. 60).
4. ENDS OF BORE HOLE SHALL BE SEALED TO PREVENT ENTRANCE OF FILL MATERIAL, AS REQUIRED.
5. JOINT SHALL BE INSTALLED AT END OF CASING PIPE. SEE DETAIL (SEE DRAWING NO. 60).
6. CASING OF LARGER SIZE THAN SHOWN IN THE ABOVE CHART OR CASING FOR PIPES LARGER THAN 12" OR OF DIFFERENT TYPE THAN SHOWN SHALL BE APPROVED BY THE CITY ENGINEER PRIOR TO INSTALLATION.

REV. NO.	REV. DATE	REV. BY
3	6/1/2003	HL/EA
DIGITIZED	1/1/92	
DWG. BY RC	SCALE	
CK. BY	NONE	

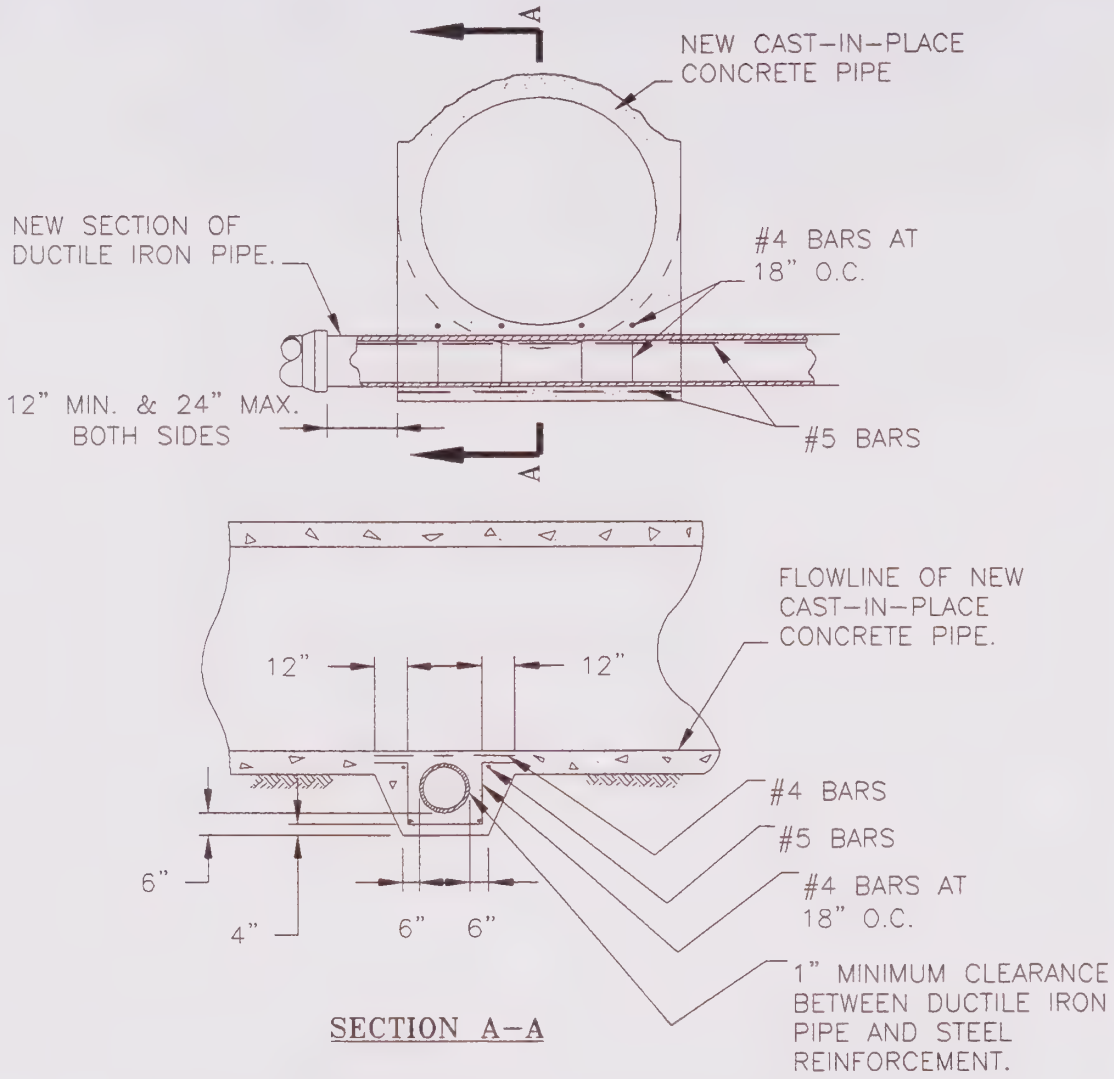
JACKING DETAILS FOR PIPES

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbarr J. O'Regan
DATE: 11/25/03

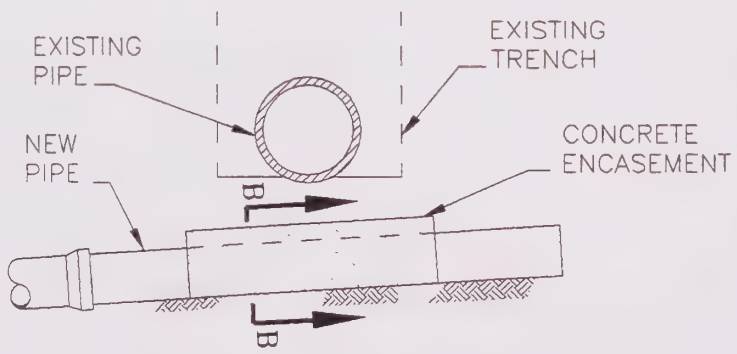
SUPERCEDES DWG. DATED 01/09/02

DRAWING NO. 60A

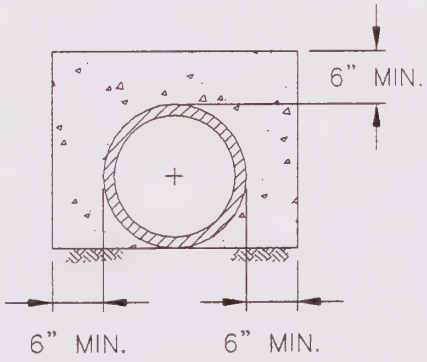


SECTION A-A

CAST-IN-PLACE STORM DRAIN



TYPICAL SECTION



SECTION B-B

DETAILS OF PROTECTION FOR NEW SEWERS

REV. NO.	REV. DATE	REV. BY
2	6/1/2000	HLE/RH
DIGITIZED	1/1/92	
DWG. BY	RC	SCALE
CK. BY		NONE

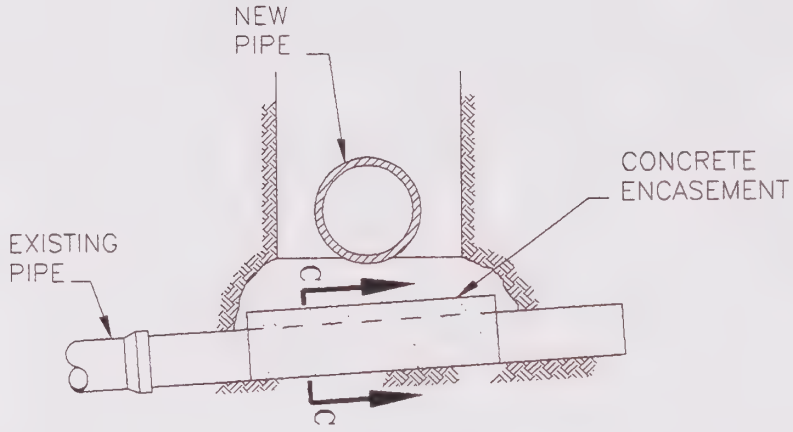
PROTECTION OF STORM DRAINS AND SANITARY SEWER LINES

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

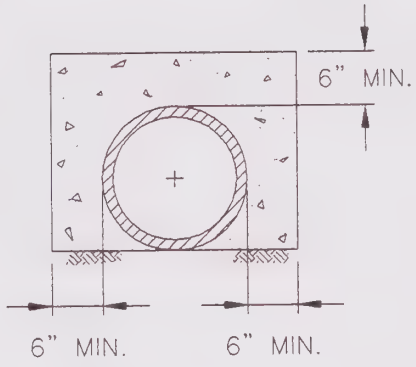
REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 01/09/02

SUPERCEDES DWG. DATED	DRAWING NO.
10/7/93	61

(CONT'D FROM DWG. 61)



TYPICAL SECTION



SECTION C–C

DETAILS OF PROTECTION FOR EXISTING SEWERS

NOTES:

1. CONCRETE FOR ENCASEMENT SHALL BE CLASS "B" CONCRETE POURED AGAINST THE UNDISTURBED EARTH.
2. THE CONCRETE ENCASEMENT SHALL EXTEND ACROSS THE FULL WIDTH OF THE TRENCH PLUS AN ADDITIONAL 12" INTO UNDISTURBED EARTH ON EACH SIDE OF THE TRENCH.
3. WHEN THE CLEARANCE BETWEEN THE BOTTOM OF THE DRAIN AND THE TOP OF THE SEWER IS LESS THAN 18", THE SEWER SHALL BE ENCASED OR BLANKETED AS INDICATED.
4. CAST–IN–PLACE STORM DRAINS
   - (A) WHEN THE CLEARANCE BETWEEN THE BOTTOM OF THE STORM DRAIN AND THE TOP OF THE SANITARY SEWER IS LESS THAN 6". THE SANITARY SEWER SHALL BE ENCASED MONOLITHICALLY WITH THE BASE OF THE DRAIN. IN ADDITION IT SHALL BE CONSTRUCTED OR REPLACED WITH DUCTILE IRON PIPE.
   - (B) WHEN THE BOTTOM SLAB OF THE CAST–IN–PLACE STORM DRAIN INTERSECTS SEWERS UNDER 15" IN DIAMETER, CONSTRUCT PER TYPICAL ENCASEMENT AS SHOWN ABOVE.

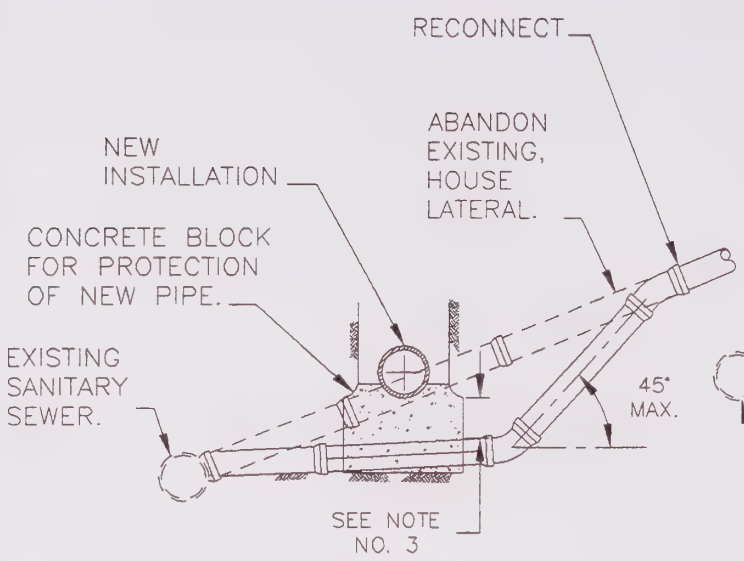
REV. NO.	REV. DATE	REV. BY
2	6/1/2000	HLE/RH
DIGITIZED	1/1/92	
DWG. BY	RC	SCALE
CK. BY		NONE

PROTECTION OF STORM DRAINS AND SANITARY SEWER LINES

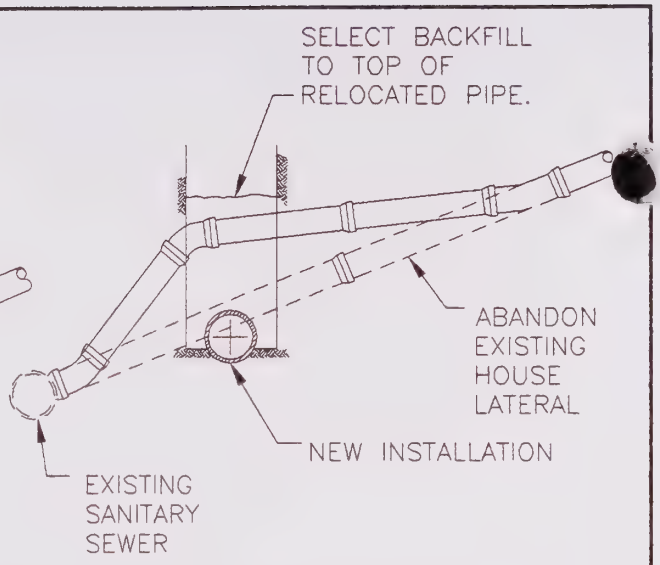
CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 01/09/02

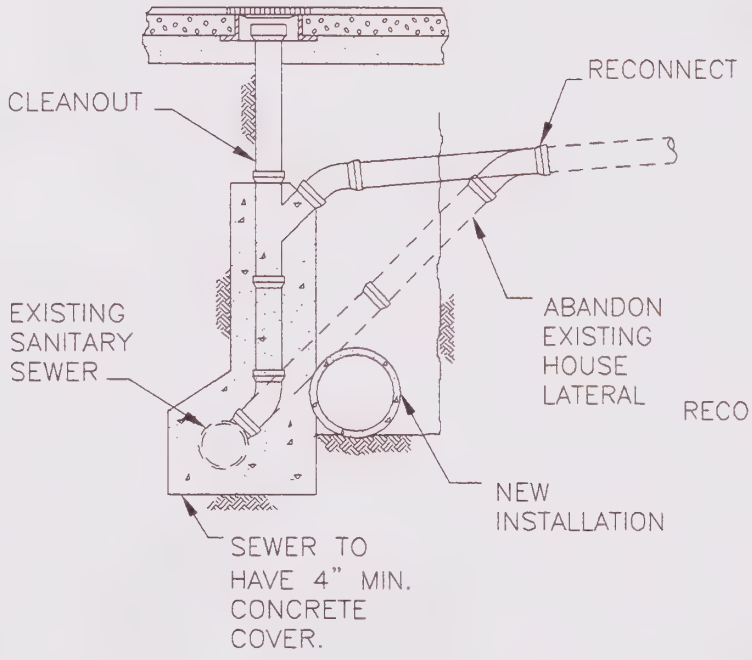
SUPERCEDES DWG. DATED	DRAWING NO.
10/7/93	61A



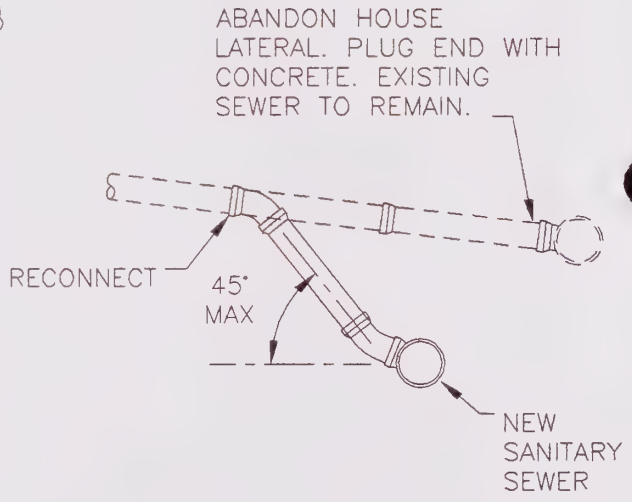
CASE NO. 1



CASE NO. 2



CASE NO.3

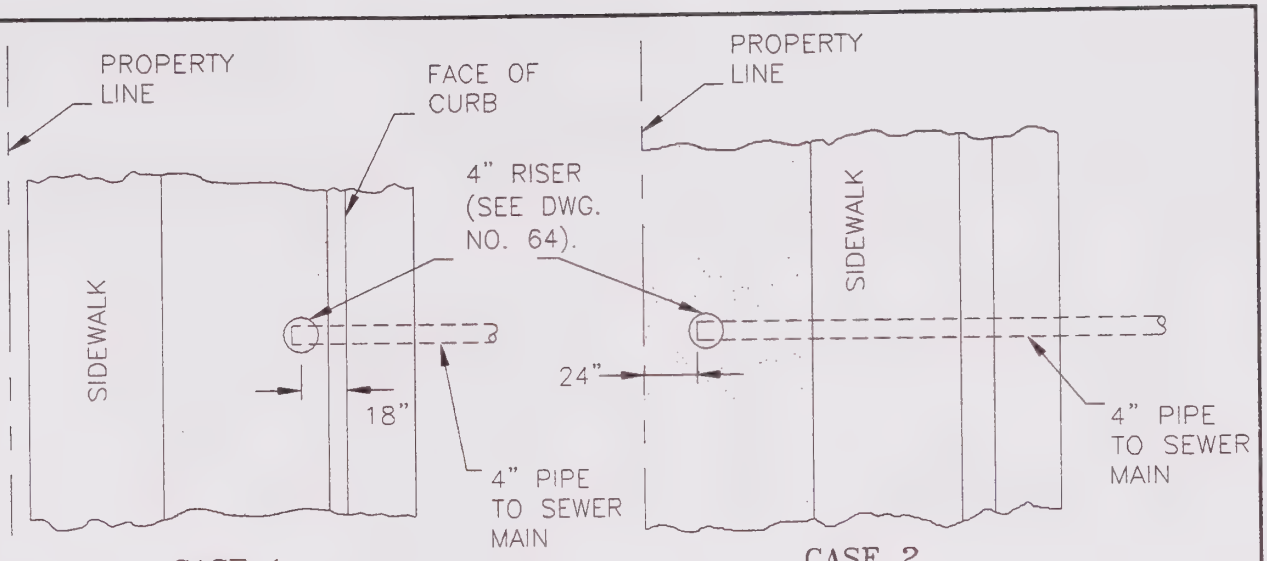


CASE NO. 4

NOTES:

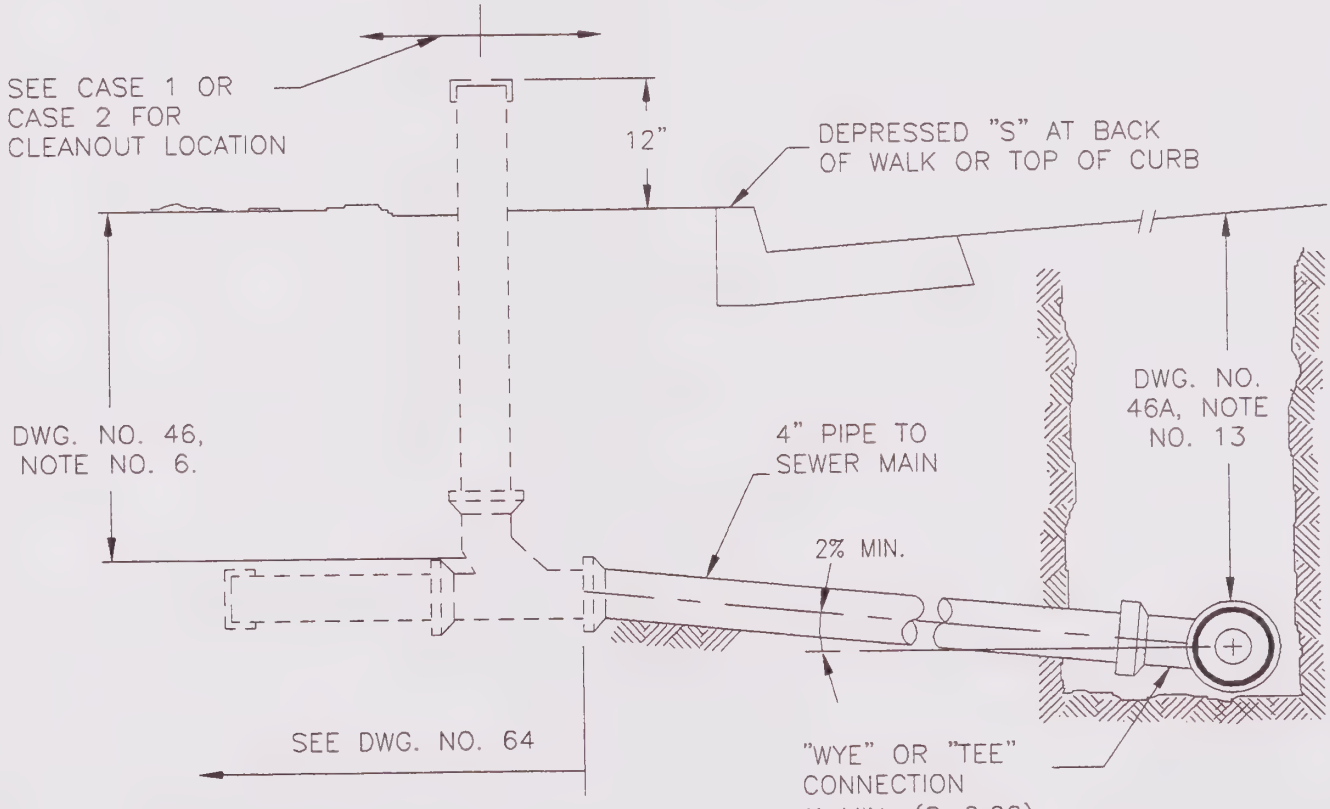
1. THE 6" SADDLE SHALL BE USED WHERE NECESSARY AND SHALL BE CONNECTED TO THE PIPE CONSTITUTING THE EXISTING "WYE" OR "TEE" OR TO THE NEXT LOWER PIPE LENGTH.
2. WYE MAY BE LAID "FLAT" UPON SPECIAL APPROVAL OF THE CITY ENGINEER. CASE NO. 3 SHALL BE USED ONLY WHEN CASE NO. 1 HAS LESS THAN THEN REQUIRED SLOPE.
3. IF 4" OR MORE CLEARANCE, NO CONCRETE IS NECESSARY. IF CONCRETE IS REQUIRED, TAKE IT DOWN TO UNDISTURBED EARTH.

REV. NO.	REV. DATE	REV. BY	EXISTING HOUSE LATERAL RELOCATION	REVISION APPROVED BY CITY ENGINEER
3	6/1/2003	HL/EA		Finbar J. O'Regan
DIGITIZED	1/1/92			DATE: 11/25/03
DWG. BY RC	SCALE		CITY OF STOCKTON	SUPERCEDES DWG. DATED 01/09/02
CK. BY	NONE		DEPARTMENT OF PUBLIC WORKS	DRAWING NO. 62



CASE 1
(SEE DWG. NO. 64)
CURB, GUTTER, SIDEWALK WITH PARKWAY STRIP.

CASE 2
(SEE DWG. NO. 64)
CURB, GUTTER, SIDEWALK WITH NO PARKWAY STRIP.



NOTES:

1. WHEN MODIFIED CURB, GUTTER, AND SIDEWALK, MEANDERING SIDEWALKS, OR ANY OTHER SPECIAL CASES ARE ENCOUNTERED, CLEANOUTS AND OTHER UTILITY LOCATIONS SHALL BE DETERMINED BY THE ENGINEER AT TIME SUBDIVISION PLANS ARE SUBMITTED FOR APPROVAL AND FINAL APPROVAL SHALL BE BY THE CITY ENGINEER.

REV. NO.	REV. DATE	REV. BY
6	6/1/2003	HL/EA
DIGITIZED	1/1/92	
DWG. BY	RC	SCALE
CK. BY		NONE

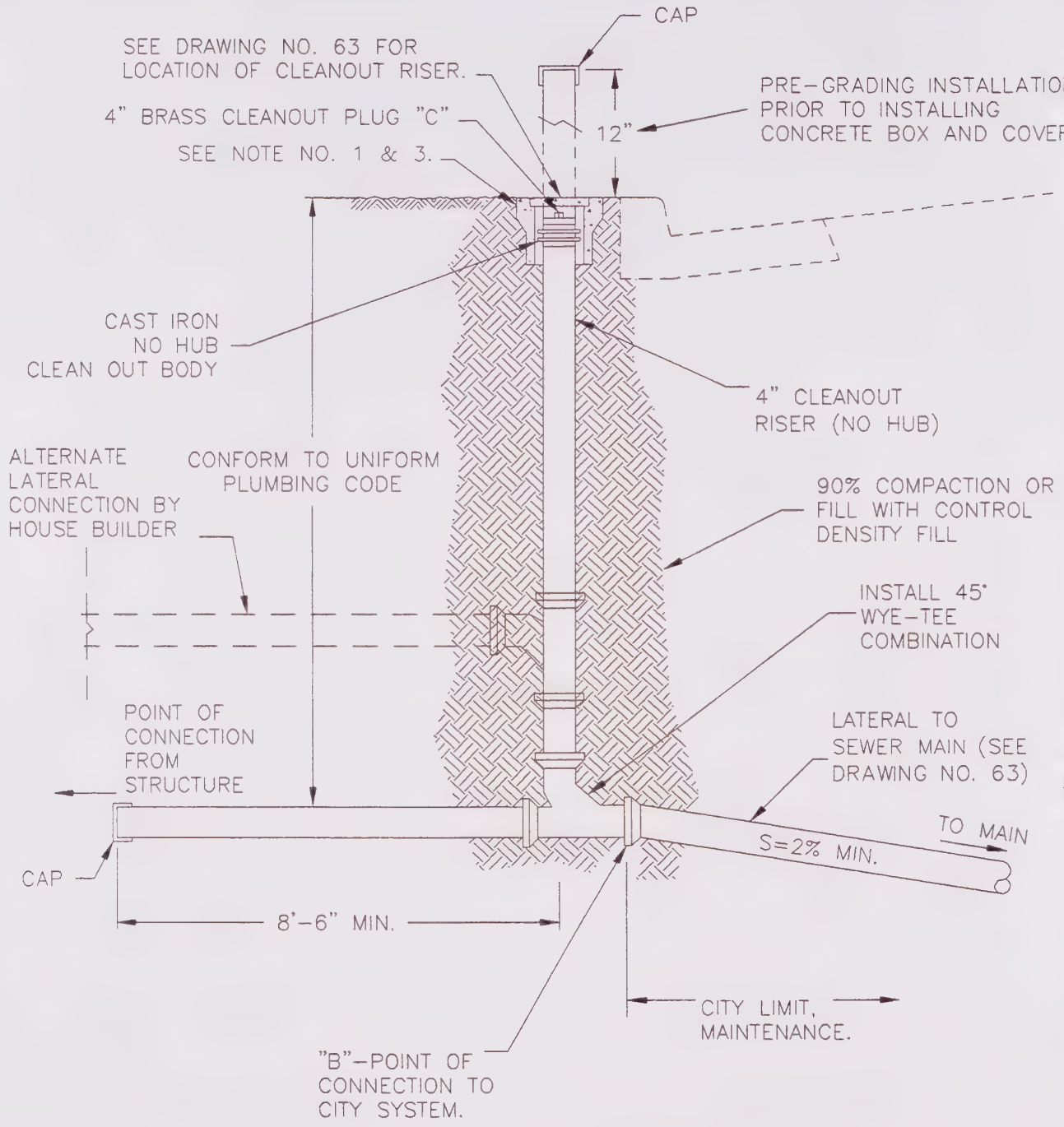
HOUSE LATERAL

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 11/25/03

SUPERCEDES DWG. DATED 01/09/02

DRAWING NO. 63



NOTES:

1. ALL FACILITIES TO BE INSTALLED BY SUBDIVIDER, EXCEPT CLEANOUT, BOX AND COVER WHICH SHALL BE INSTALLED BY PLUMBER. ALL FACILITIES ABOVE POINT "B" TO BE MAINTAINED BY PROPERTY OWNER IN ACCORDANCE WITH THE UNIFORM PLUMBING CODE.
2. ALL FACILITIES BELOW POINT "B" TO BE MAINTAINED BY THE CITY THROUGH PROPERTY OWNER'S CLEANOUT "C".
3. WHEN CLEANOUT FALLS IN DRIVEWAY, INSTALL "CHRISTY" #F-8C OR "BROOKS" #1-SP (OR EQUAL CONCRETE BOX AND COVER) CAST IRON TRAFFIC COVER. "BROOKS" #3-RT MAY ALSO BE USED.

REV. NO.	REV. DATE	REV. BY
6	6/1/2003	HL/EA
DIGITIZED	1/1/92	
DWG. BY RC	SCALE	
CK. BY	NONE	

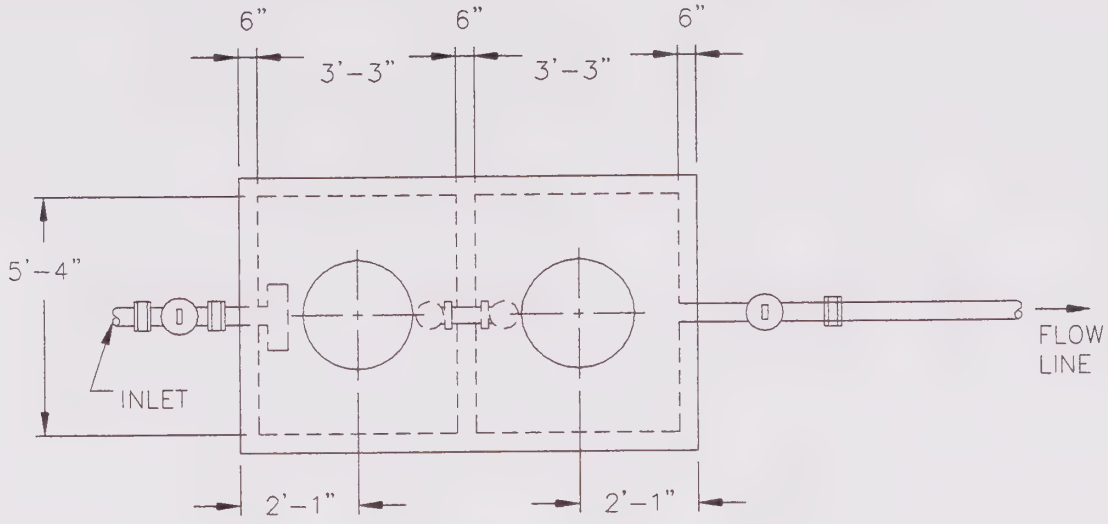
CLEANOUT

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

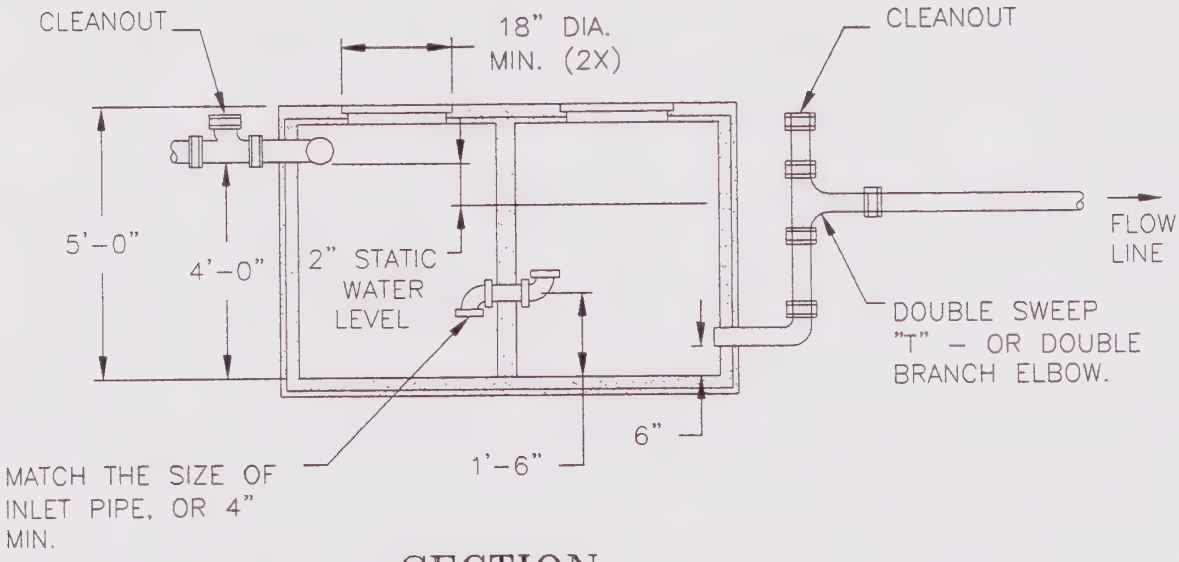
REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 11/25/03

SUPERCEDES DWG. DATED 01/09/02

DRAWING NO. 64



PLAN - VIEW



SECTION

NOTES:

1. DIMENSIONS SHOWN ARE FOR MINIMUM SIZE (750 GALLON) TRAP.
2. EACH UNIT SHALL BE DESIGNED BY A REGISTERED CIVIL ENGINEER AND APPROVED BY THE CITY ENGINEER. STREET INSTALLATIONS SHALL BE DESIGNED FOR HS20 44 LOADING.
3. ALL KITCHEN FIXTURES SHALL BE PLUMED TO FLOW THRU TRAP.
4. CONCRETE SHALL BE A MINIMUM OF 3000 PSI AT 28 DAYS.
5. COVERS SHALL BE STEEL AND SHALL BE GAS TIGHT.
6. ALL WASTE SHALL ENTER TRAP THROUGH THE INLET PIPE ONLY.
7. NO WASTE FROM RESTROOMS SHALL FLOW THROUGH TRAP.
8. EFFLUENT PIPE SHALL EXIT TANK 6" FROM BOTTOM.

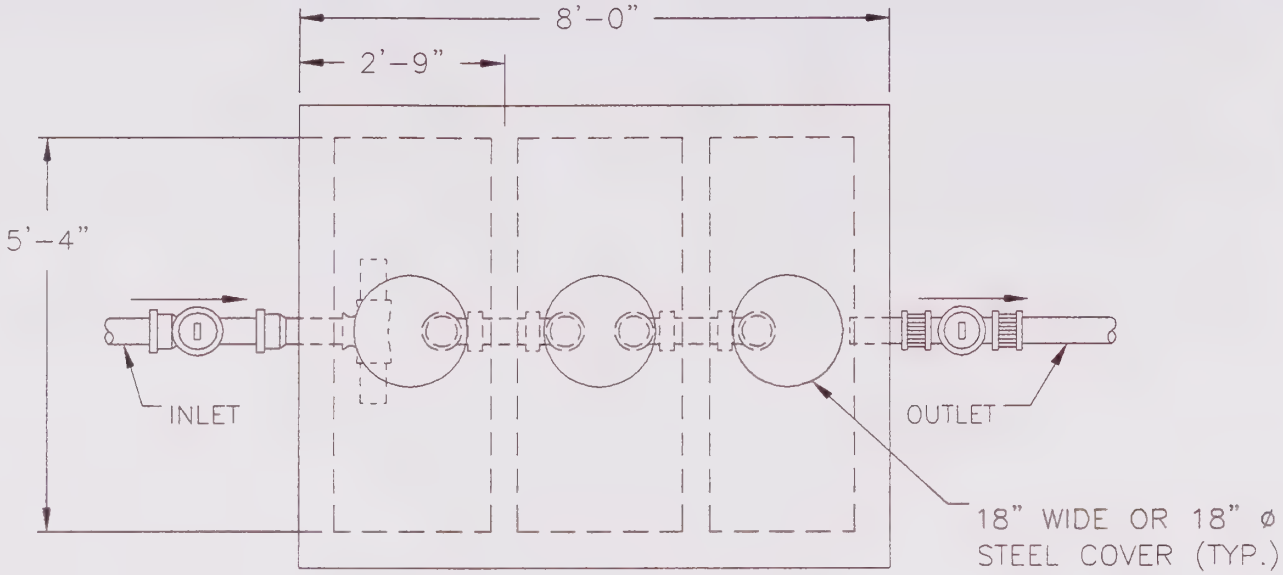
REV. NO.	REV. DATE	REV. BY
7	6/1/2000	HLE/RH
DIGITIZED	7/1/90	
DWG. BY	RC	SCALE
CK. BY		NONE

TYPICAL GREASE TRAP (750 TO 1199 GALLON)

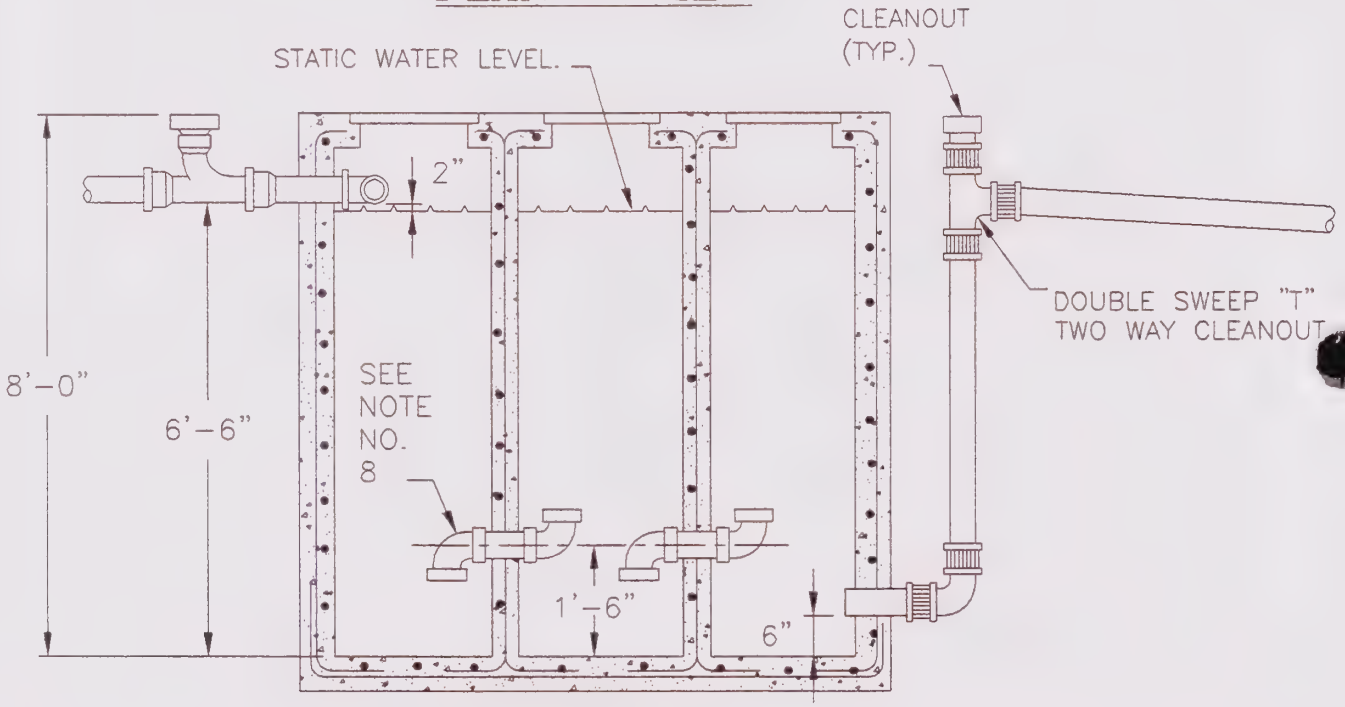
CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Kegan
DATE: 01/09/02

SUPERCEDES DWG. DATED	DRAWING NO.
2/23/95	65



PLAN – VIEW



SECTION

NOTES:

1. EACH UNIT SHALL BE DESIGNED BY A REGISTERED CIVIL ENGINEER AND APPROVED BY THE CITY ENGINEER.
2. COVERS SHALL BE STEEL AND GAS TIGHT. PROVIDE AMPLE ACCESS FOR MAINTENANCE.
3. REINFORCEMENT SHALL BE ADEQUATE FOR TRAFFIC CONDITIONS WHERE TRAP IS LOCATED.
4. ALL KITCHEN FIXTURES TO BE PLUMBED TO FLOW THROUGH TRAP.
5. CONCRETE SHALL BE 3000 PSI MINIMUM AT 28 DAYS.
6. ALL WASTE SHALL ENTER TRAP THROUGH INLET PIPE ONLY.
7. RESTROOM WASTE SHALL NOT FLOW THROUGH TRAP.
8. MATCH THE SIZE OF THE INLET PIPE, OR 4" MINIMUM DIAMETER (MAY INSTALL TWO STEEL BAFFLES INSTEAD OF 4" PIPE AND WALL IN SAME CONFIGURATION–SEE DWG. 65).

REV. NO.	REV. DATE	REV. BY
4	6/1/2000	HLE/RH
DIGITIZED	1/1/92	
DWG. BY	RC	SCALE
CK. BY		NONE

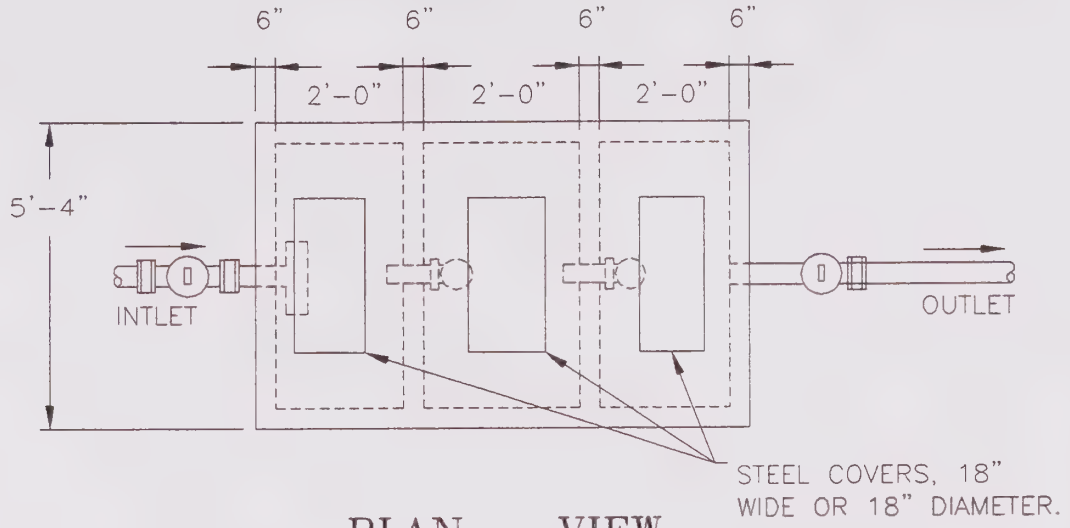
TYPICAL GREASE TRAP
(1200 GALLON OR LARGER)

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

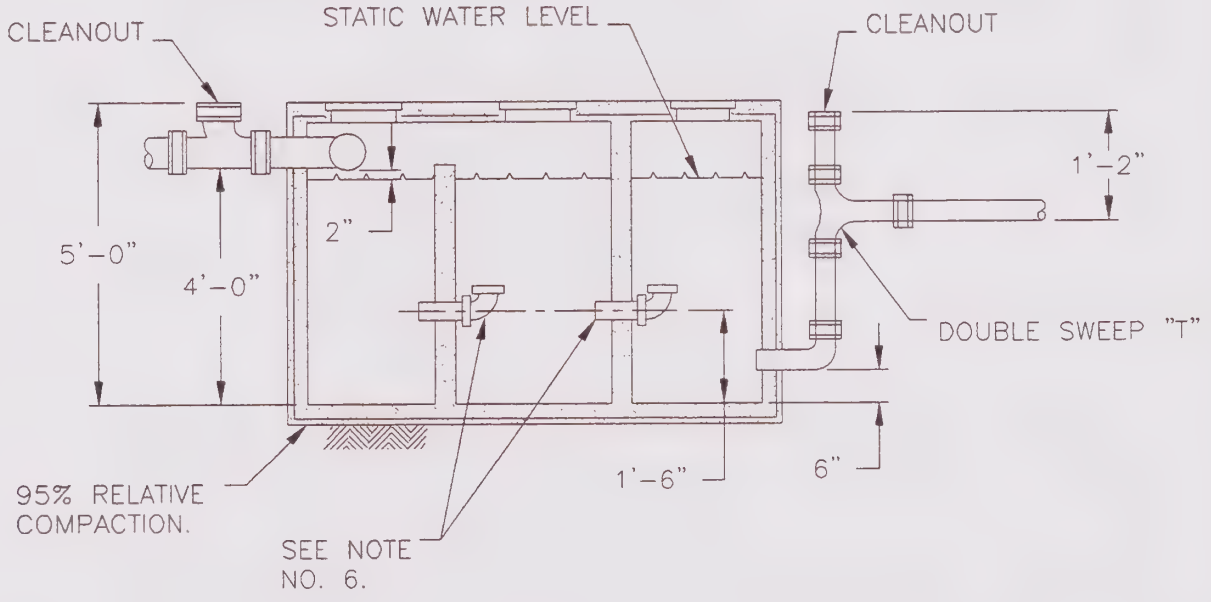
REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Rega
DATE: 01/09/02

SUPERCEDES DWG. DATED 2/23/95

DRAWING NO. 65A



PLAN - VIEW



SECTION

NOTES:

1. DIMENSIONS SHOWN ARE FOR MINIMUM SIZE (750 GALLON) TRAP.
2. EACH UNIT SHALL BE DESIGNED BY A REGISTERED CIVIL ENGINEER AND APPROVED BY THE CITY ENGINEER. STREET INSTALLATIONS SHALL BE DESIGNED FOR HS20 44 LOADING.
3. CONCRETE SHALL BE A MINIMUM OF 3,000 PSI AT 28 DAYS.
4. ALL WASTE SHALL ENTER TRAP THROUGH INLET PIPE ONLY.
5. COVERS SHALL BE STEEL AND SHALL BE GAS TIGHT.
6. 4" MINIMUM PIPE WITH 90° ELBOW INSTALL AS SHOWN, OR MATCH INLET PIPE SIZE.

REV. NO.	REV. DATE	REV. BY
6	6/1/2000	HLE/RH
DIGITIZED	1/1/92	
DWG. BY	RC	SCALE
CK. BY		NONE

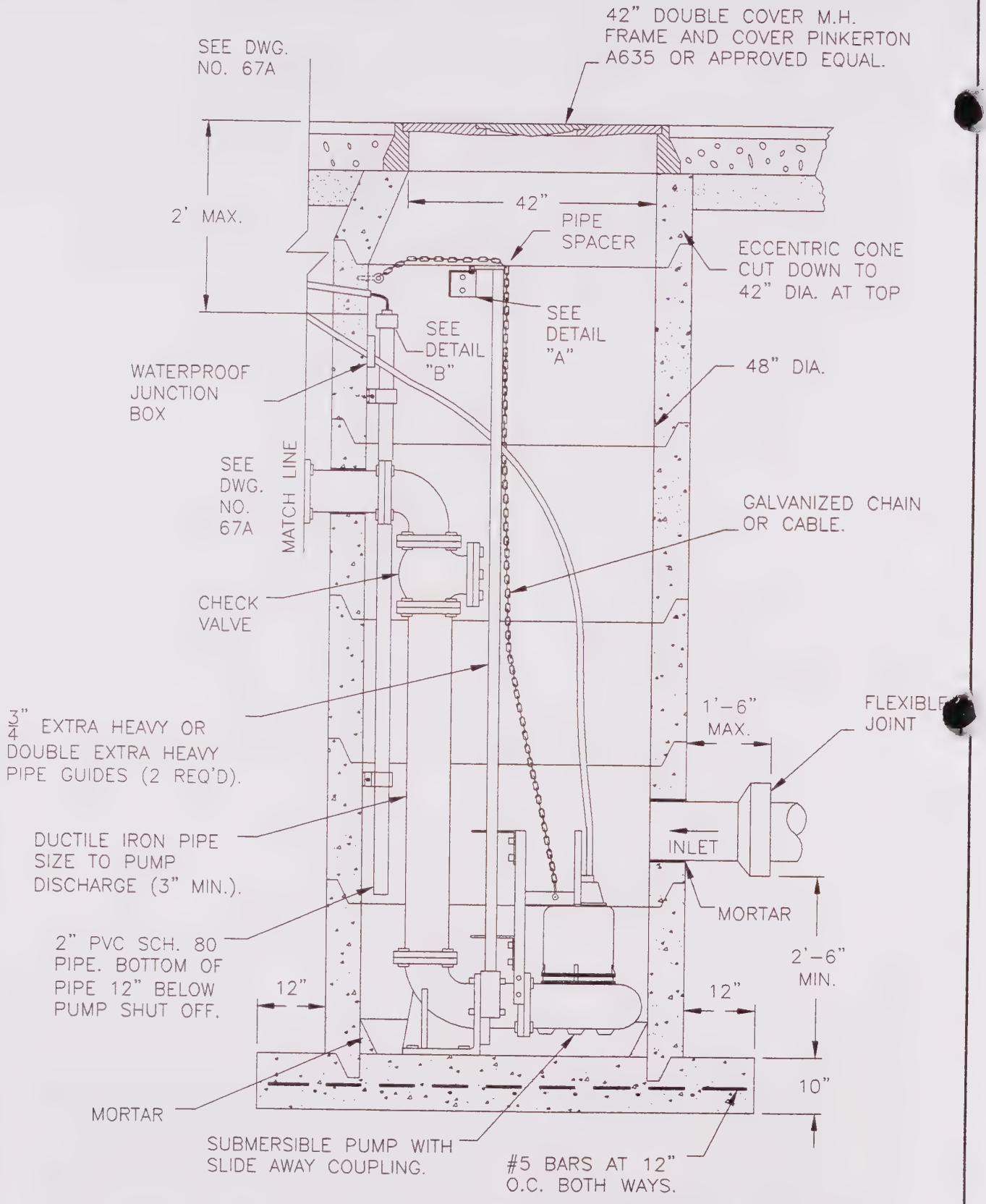
TYPICAL SAND & OIL TRAP

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 01/09/02

SUPERCEDES DWG. DATED 2/23/95

DRAWING NO. 66



REV. NO.	REV. DATE	REV. BY
5	6/1/2003	HL/EA
DIGITIZED	1/1/92	
DWG. BY RC	SCALE	
CK. BY	NONE	

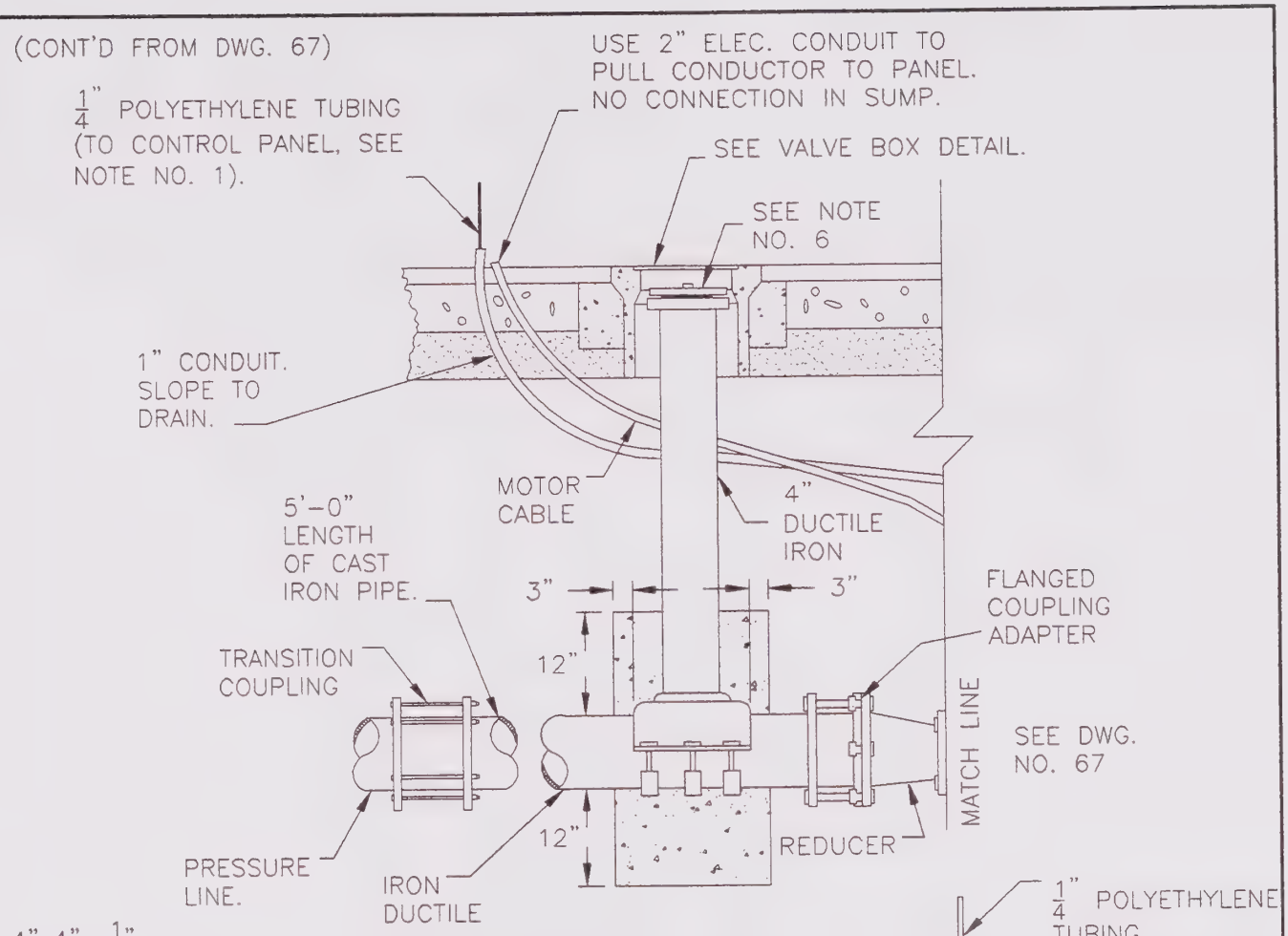
TEMPORARY MAINTENANCE HOLE
S.S. PUMPING STATION

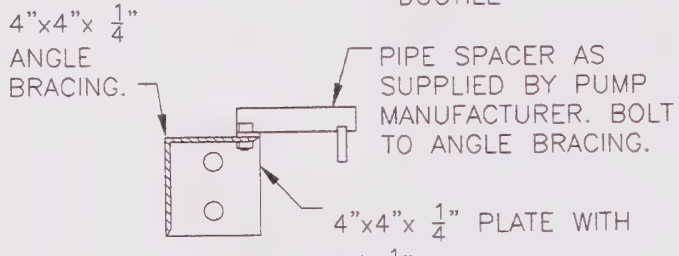
CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 11/25/03

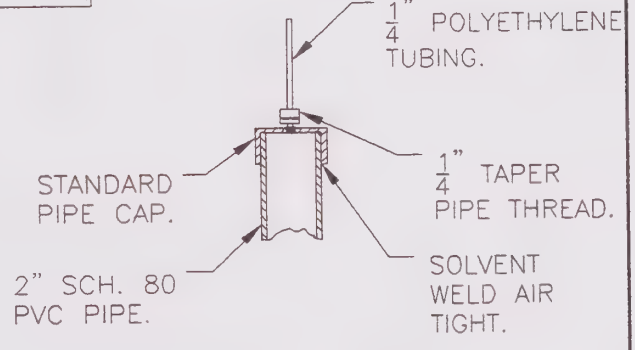
SUPERCEDES DWG. DATED	DRAWING NO.
01/09/02	67

(CONT'D FROM DWG. 67)





DETAIL "A"



DETAIL "B"

NOTES:

1. PANEL SHALL HAVE EXTERNAL RESET, EXTERNAL LOCKABLE "ON" OR "OFF", AND KEY TYPE H-O-A IN WEATHERPROOF PANEL.
2. PUMPING STATION TO BE USED FOR TEMPORARY INSTALLATIONS ONLY WHEN APPROVED BY THE CITY ENGINEER.
3. PUMP DATA:
   3ø 220 VOLTS HIGH HEAD SEWAGE PUMP WITH "SLIDE AWAY COUPLING" OR EQUAL.
4. CUT THE ENDS OF THE 4"x4"x 1/4" ANGLE BRACE TO FIT THE CURVATURE OF THE M.H., VERIFY IN FIELD.
5. INTERIOR OF M.H. TO BE COATED IN ACCORDANCE WITH SECTION 71-1.09 OF STANDARD SPECIFICATIONS.
6. SCREW CAP WITH 2 1/2" STANDARD FIRE HYDRANT CONNECTION.

REV. NO.	REV. DATE	REV. BY
5	6/1/2003	HL/EA
DIGITIZED	1/1/92	
DWG. BY	RC	SCALE
CK. BY		NONE

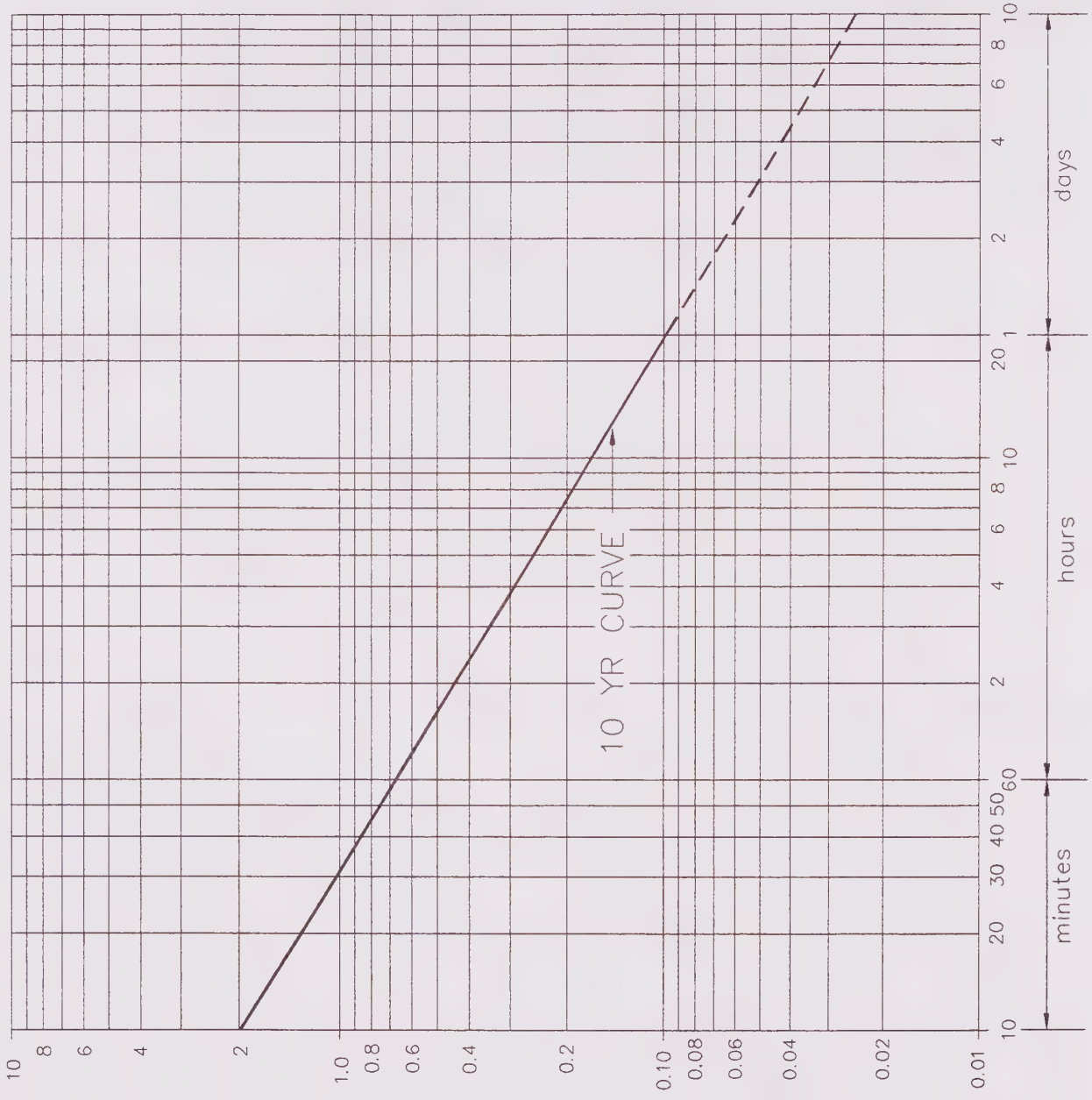
TEMPORARY MAINTENANCE HOLE
S.S. PUMPING STATION

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 11/25/03

SUPERCEDES DWG. DATED	DRAWING NO.
01/09/02	67A

Intensity–Duration–Frequency Curve (Stockton, California)



EQUATION: $I = (7.9659)X(D)^{(-0.604)}$

I is in inches/hour
D is in minutes

REV. NO.	REV. DATE	REV. BY
2	6/15/00	BB
DIGITIZED	1/1/92	
DWG. BY	RC	SCALE
CK. BY		NONE

CITY OF STOCKTON
10–YR. RAINFALL INTENSITY CURVE
CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

DIGITIZED VERSION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 01/09/02

SUPERCEDES DWG. DATED	DRAWING NO.
11/8/80	75

STORM DESIGN SHEET
CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

SUBJECT _____

DESCRIPTION _____

JOB NO. _____ PAGE ___ OF ___
DES. BY _____ DATE _____
CHK'D BY ____ DATE _____

BEGINNING DESIGN DATA: ASSUMED TIME TO INLET = _____ MINUTES
ELEVATION HGL AT BEGINNING OF SYSTEM = _____ △ HGL ELEV. _____
ELEVATION HGL AT END OF SYSTEM = _____ APPROX. SYSTEM LENGTH _____
MANNINGS "N" VALUE USED = _____ APPROX. AVERAGE SLOPE _____
(NOTE 4, DWG. 76)

POINT OF CONCENTRATION	CONTRIB. Ac (A)	RUN OFF COEF(C)	CA	Σ CA	INTEN-SITY (i)	Q cfs (Σ CA x i)	PIPE DIA. (in)	PIPE SLOPE FT/FT	HGL SLOPE FT/FT	LENGTH (FT)	△ ELEV. (FT)	ELEV. HGL (FT)	ACTUAL VELOCITY (FT/S)	T, MIN. IN PIPE	T, MIN. TOTAL

STORM DESIGN SHEET

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

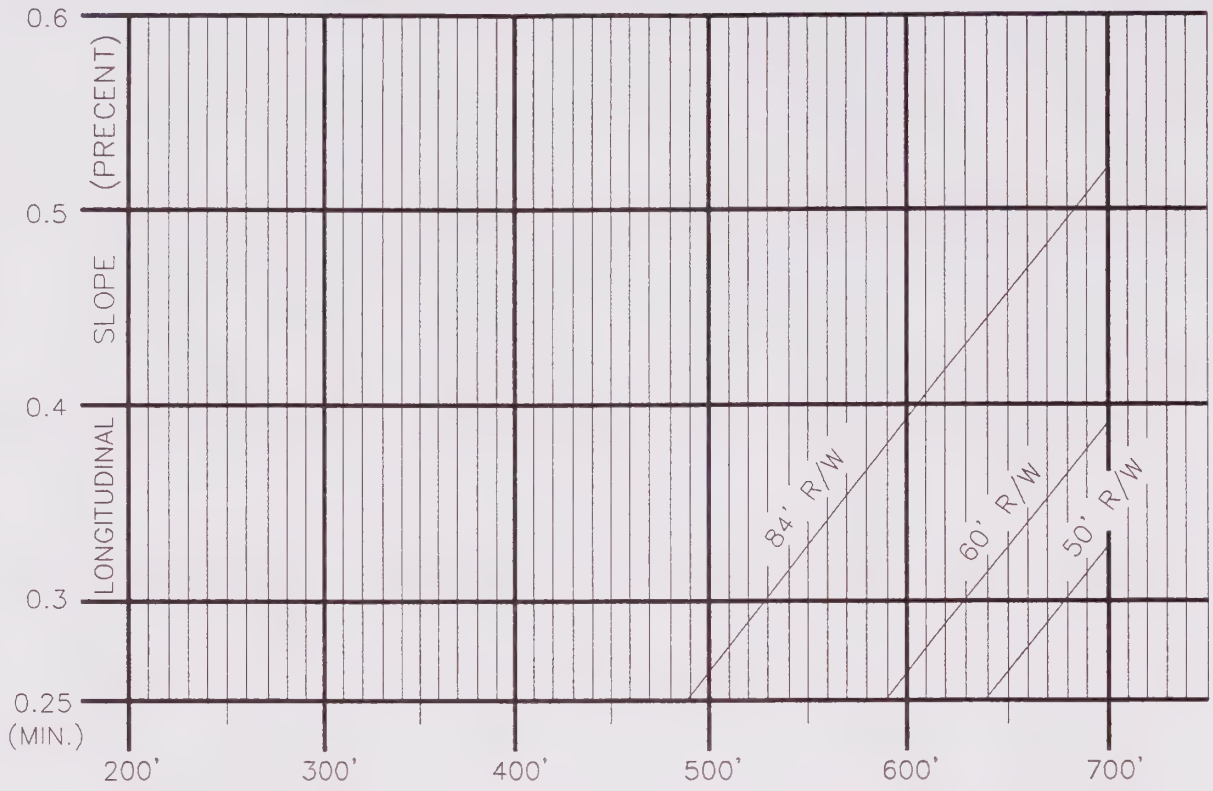
DIGITIZED VERSION APPROVAL BY CITY ENGINEER
Finbar J. O'Regan
DATE: 11/25/03

SUPERCEDES DWG. DATED 01/09/02

DRAWING NO. 75A

REV. NO.	REV. DATE	REV. BY
4	6/1/2003	HL/EA

DIGITIZED 7/1/89
DWG. BY RC
CK. BY DW
SCALE NONE



NOTES:

1. INITIAL RAINFALL INTENSITY = 1.30 IN./HR. (10-YRS. STORM)
   INITIAL TIME OF CONCENTRATION = 20 MINUTES
   RUNOFF COEFFICIENTS: PARK=15%, LOT=35%, RESIDENTIAL=35%, PARKWAY=60%, HIGH DENSITY RESIDENTIAL=65%, COMMERCIAL=75%-90%, INDUSTRIAL AND PAVED AREA=90%.
2. STORM SYSTEMS SHALL HAVE A MINIMUM DESIGN USING THE CITY OF STOCKTON 10-YEARS RAINFALL CURVE.
3. THE ABOVE FIGURES MAY BE ADJUSTED FOR THE INDIVIDUAL DEVELOPMENTS UPON PRESENTATION BY THE DEVELOPER OF A DETAILED RUNOFF ANALYSIS.
4. PIPE SLOPES AS PER STANDARD DRAWING NO. 77. MANNING "N" SHALL BE 0.011 FOR PVC AND HDPE PIPE AND SHALL BE 0.013 FOR OTHER PIPE MATERIALS.
5. MAIN STORM TRUNKS SHALL BE 12" DIAMETER MINIMUM AND HAVE 3'-0" MINIMUM OF COVER FROM SUBGRADE.
6. THE SANITARY EXTENSION MUST BE LOCATED ON-SITE WITHIN 20'-0" OF THE LOCATION WHERE A PORTABLE SUBMERSIBLE PUMP CAN BE DROPPED INTO THE LOWEST AREA OF THE WET WELL. THE END OF THIS EXTENSION SHALL BE PROVIDED WITH A 4" CAMLOCK COUPLING AND ENDCAP.
7. THE SANITARY LINE EXTENDED INTO THE PUMP STATION SHALL BE DESIGNED TO CARRY AT LEAST 600 GPM WITH THE HYDRAULIC GRADE LINE BELOW GRADE.
8. AT THE LOCATION WHERE THE SUBMERSIBLE PUMP CAN BE LOWERED INTO THE LOWEST AREA OF THE WET WELL, A 30 AMP FUSIBLE DISCONNECT SHALL BE AT THE MOTOR CONTROL CENTER (MCC) WHICH OPERATES THE LOW FLOW PUMP. THIS CONNECTION SHALL HAVE APPROPRIATELY SIZED WIRE ENCLOSED IN CONDUIT BELOW GRADE. THE WIRES SHALL BE PROPERLY TERMINATED AT THE REMOTE FUSIBLE DISCONNECT AT THE MCC, THE WIRES SHALL NOT BE TERMINATED. INSTEAD, SUFFICIENT WIRE SHALL BE COILED IN THE CONTROL CUBICLE FOR THE LOW FLOW PUMP TO ALLOW THE CITY TO DISCONNECT THE INPLACE PUMP AND CONNECT THE FUSIBLE DISCONNECT.
9. SANITARY SEWER LINE SHALL BE EXTENDED TO ALL FUTURE STORM WATER PUMP STATIONS (SEE DWG. NO. 45A).

REV. NO.	REV. DATE	REV. BY
2	6/1/2000	HLE/RH

DIGITIZED 1/1/92

DWG. BY RC | SCALE

CK. BY | NONE

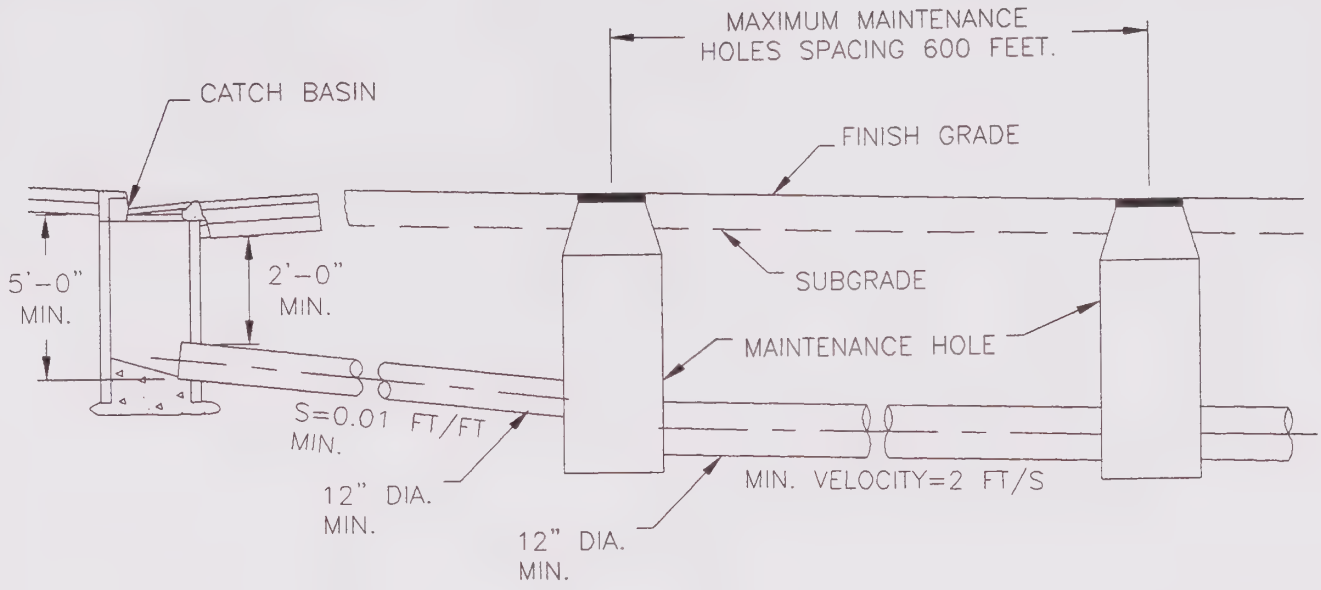
STORM RUNOFF DATA

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbarr J. O'Regan
DATE: 01/09/02

SUPERCEDES DWG. DATED 6/1/94

DRAWING NO. 76



CAST IN PLACE (C.I.P.) CONCRETE PIPE SHALL MEET THE FOLLOWING MIN. STRENGTH REQUIREMENTS:

1400 PSI ..... 3 DAYS
2100 PSI ..... 7 DAYS
3500 PSI ..... 28 DAYS

CONCRETE SHALL BE CLASS A

PIPE SIZE	MIN. SLOPE (N=0.013)	MIN. SLOPE (N=0.011)
12" DIA.	.0020 FT/FT	.0014 FT/FT
15" DIA.	.0015 FT/FT	.0010 FT/FT
18" DIA.	.0012 FT/FT	.0009 FT/FT
24" DIA.	.0008 FT/FT	.0006 FT/FT
30" DIA.	.0006 FT/FT	.0001 FT/FT

NOTES:

1. CATCH BASINS SHALL BE INSTALLED AT ALL INTERSECTIONS AND AT ENDS OF ALL CUL-DE-SACS WHERE THE SLOPE AROUND THE CUL-DE-SAC IS LESS THAN 0.0035 FT/FT. SLOPE SHALL BE A MINIMUM OF .01 FT/FT ALONG THE ARC LENGTH OF CORNERS.
2. ALL CATCH BASIN LATERALS SHALL BE CONNECTED AT MAINTENANCE HOLES AND NOT DIRECTLY INTO TRUNK LINES.
3. MAXIMUM RUNS BETWEEN CATCH BASINS SHALL BE IN ACCORDANCE WITH STANDARD DRAWING NO. 76.
4. ALL STORM DRAINS TO BE DESIGNED FOR GRAVITY FLOW (MATCHING OF PIPE CROWNS - NOT INVERT ELEVATIONS).
5. RUBBER GASKETED PIPE REQUIRED WHEN LINES ARE SURCHARGED.
6. 12" THROUGH 36" PIPE SHALL BE CLASS III MIN. R.C.P.; OR NON-REINFORCED CONCRETE PIPE MEETING CAL-TRANS SPECIFICATIONS AND A "D" LOADING EQUIVALENT TO CLASS III R.C.P., 34" AND LARGER PIPE SHALL BE CLASS III R.C.P. ONLY. FOR C.I.P. PIPE, SEE NOTE NO. 7 BELOW.
7. C.I.P. PIPE ALLOWED FOR 24" AND LARGER PIPES WITH APPROVAL OF THE CITY ENGINEER.
8. FOR 12" THROUGH 15" PLASTIC PIPE, SDR 35 PVC. MEETING ASTM 3034 STANDARDS MAY BE USED.

REV. NO.	REV. DATE	REV. BY
3	6/1/2000	HLE/RH
DIGITIZED	7/1/91	
DWG. BY	RC	SCALE
CK. BY		NONE

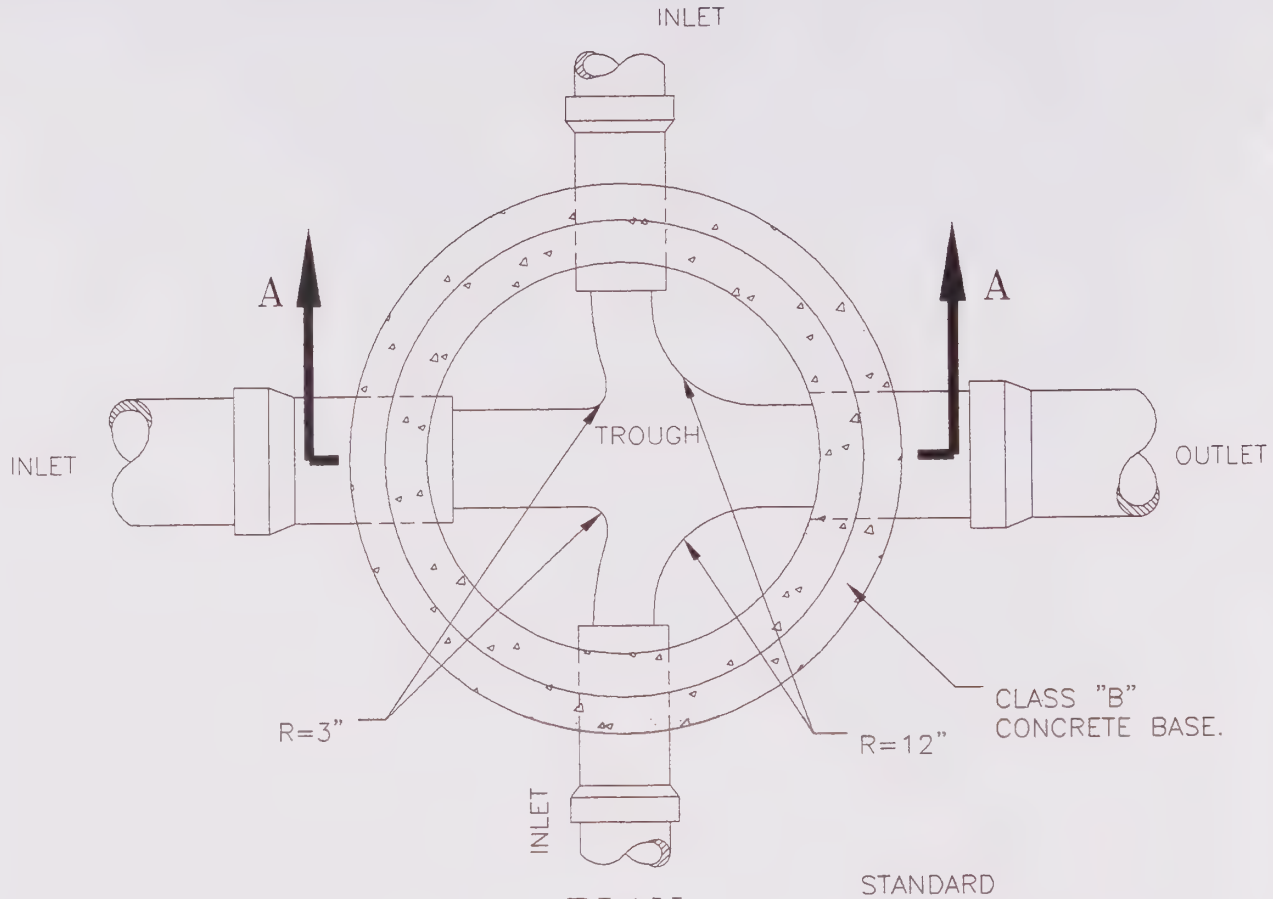
STORM DRAIN DATA

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

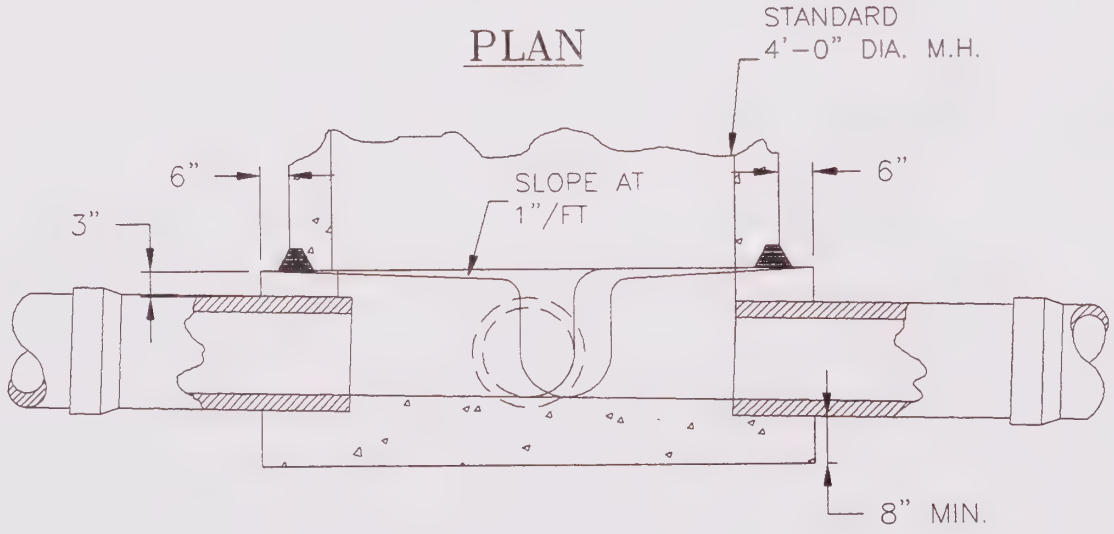
REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 01/09/02

SUPERCEDES DWG. DATED 2/23/95

DRAWING NO. 77



PLAN



SECTION A-A

NOTES:

1. TROUGH WITHIN M.H. TO BE FULLY ACCESSIBLE.
2. INLET PIPES NOT TO EXTEND MORE THAN 3" INTO M.H.
3. OUTLET PIPE TO BE FLUSH AND ALL EDGES SMOOTH WITH M.H. WALL.
4. CONSTRUCT PIPE STUB JOINTS, 2'-0" MINIMUM TO 12'-0" MAXIMUM FOR PVC PIPE AND 2'-0" MAXIMUM FOR RIGID PIPE FROM BASE OF M.H.
5. M.H. BOTTOM SHALL BE HYDRAULICALLY SHAPED IN THE FIELD AS DIRECTED.

REV. NO.	REV. DATE	REV. BY
4	6/1/2003	HL/EA
DIGITIZED	1/1/92	
DWG. BY	RC	SCALE
CK. BY		NONE

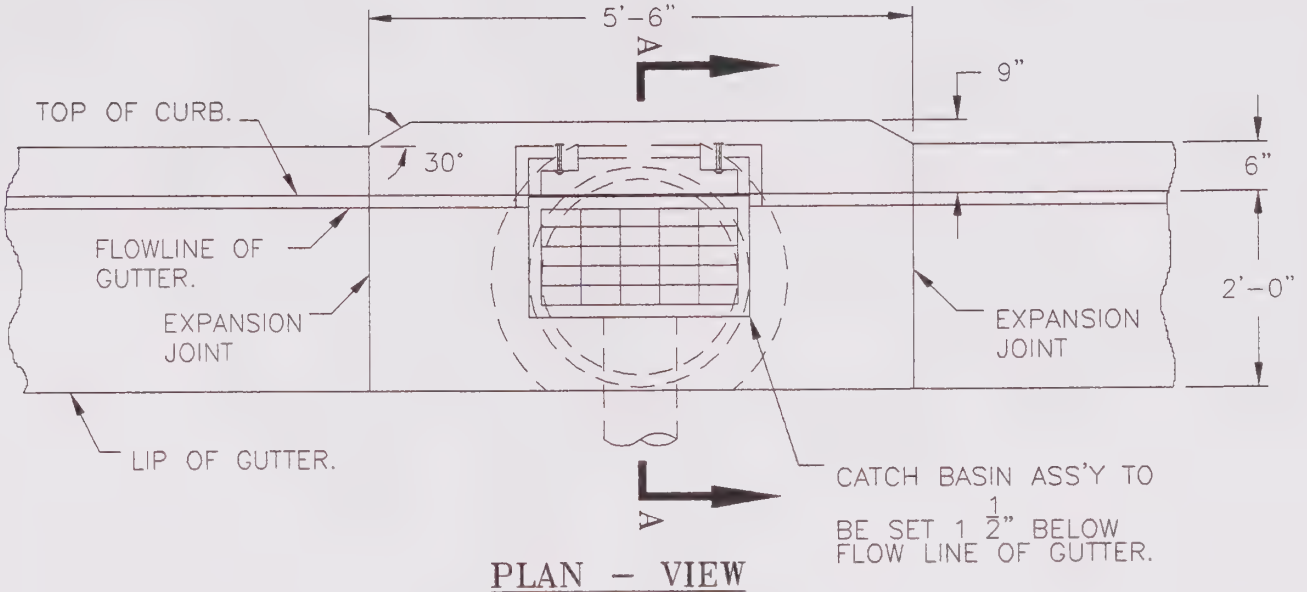
TYPICAL INTERSECTION FOR
TYPE 1 MAINTENANCE HOLE

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

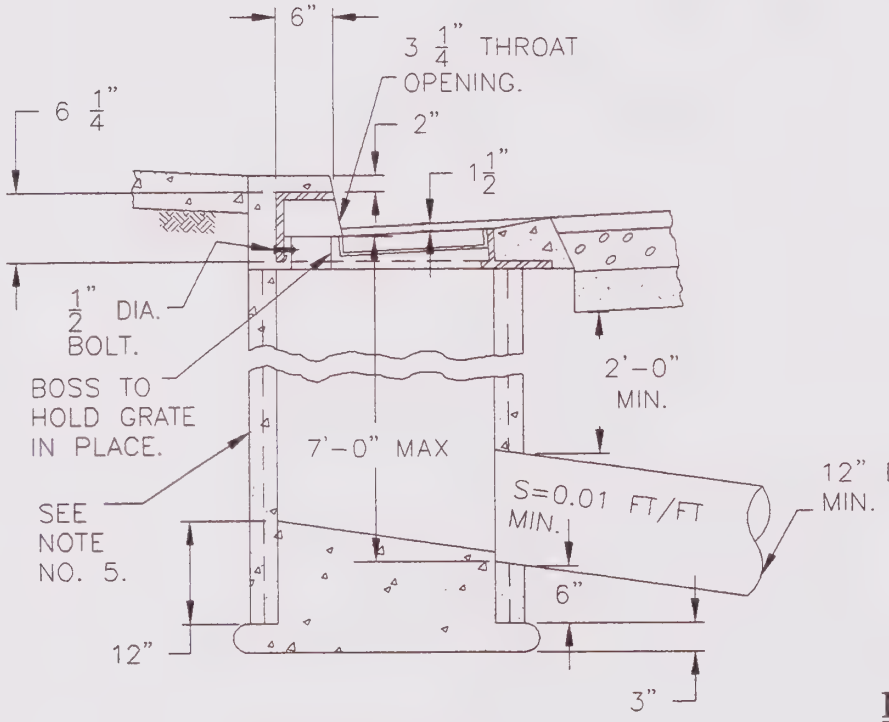
REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 11/25/03

SUPERCEDES DWG. DATED 01/09/02

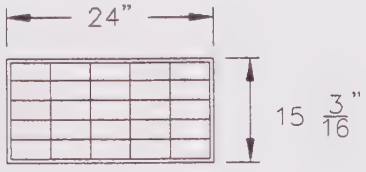
DRAWING NO. 78



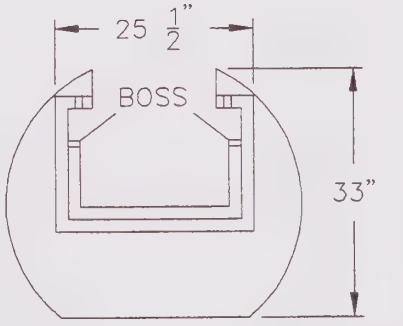
PLAN – VIEW



SECTION A–A



GRATE



PLAN – VIEW OF FRAME

NOTES:

1. ALL EXPOSED STEEL SHALL BE COATED WITH 2 COATS OF COAL TAR PITCH HEATED TO A MINIMUM OF 180°F OR GALVANIZED.
2. GRATE, FRAME AND MODIFIED SIDE INLET SHALL CONFORM TO PINKERTON A–645 FRAME WITH EITHER A–390 RIVETED OR A–390–M FABRICATED STEEL GRATE.
3. GRATE SHALL BE CHAINED TO FRAME.
4. GRATE SHALL BE DEPRESSED 1½" BELOW GUTTER PROFILE GRADE.
5. 24" DIA. PIPE BARREL SHALL BE CLASS II R.C.P., OR CLASS 2 OR 3 NON–REINFORCED CONCRETE PIPE.
6. TOP OF CURB SHALL BE STAMPED PER DWG. NO. 201H.

REV. NO.	REV. DATE	REV. BY
7	6/1/2003	HL/EA
DIGITIZED	1/1/92	
DWG. BY	RC	SCALE
CK. BY		NONE

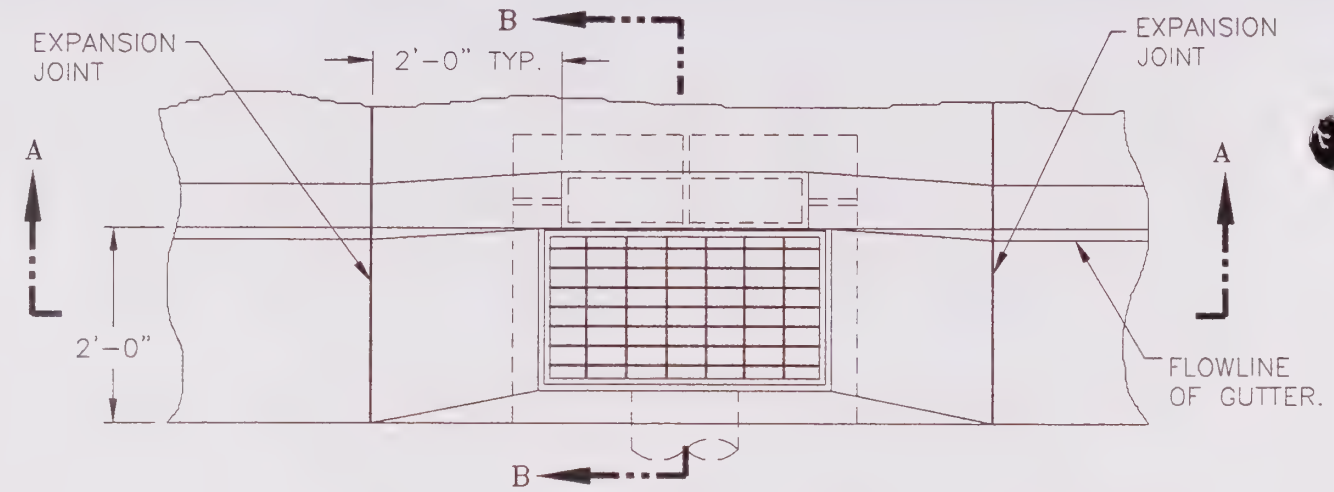
TYPE 1 CURB INLET CATCH BASIN

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

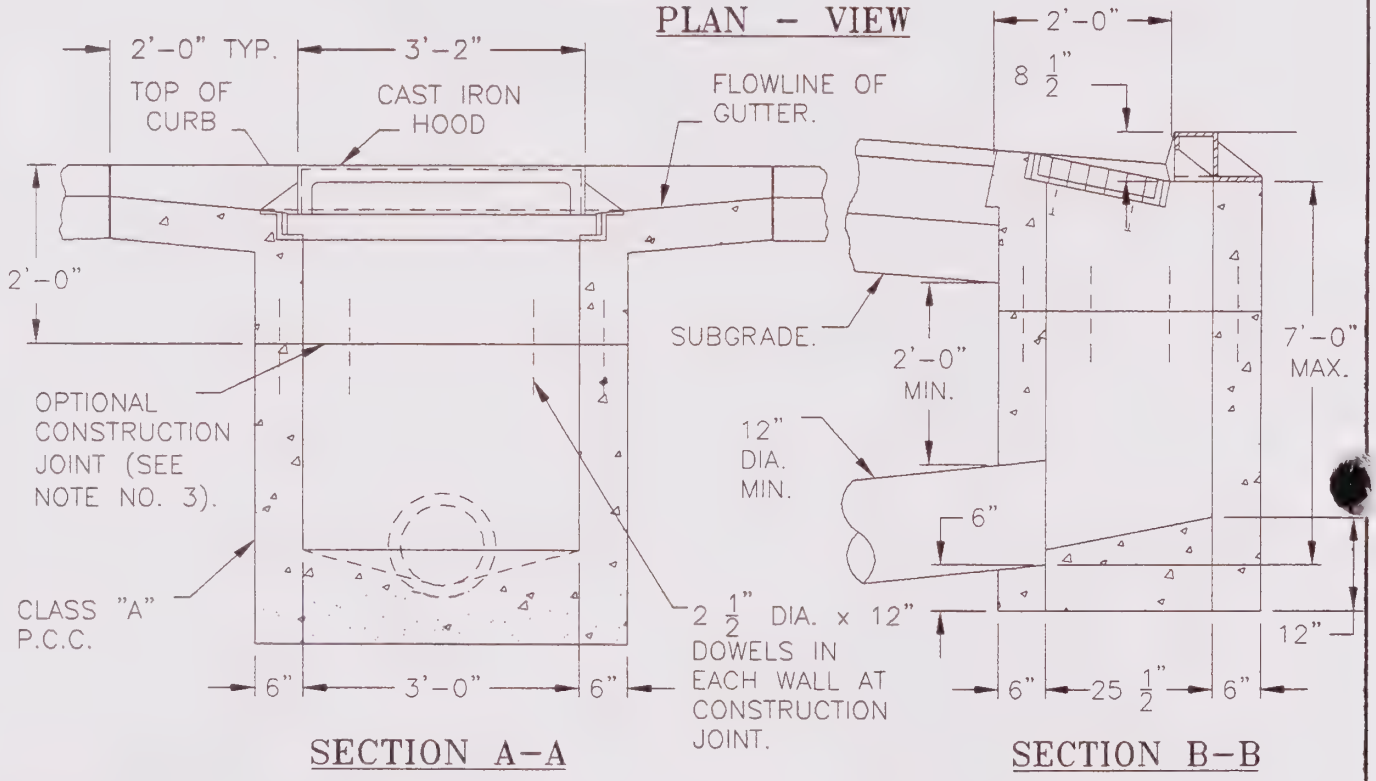
REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 11/25/03

SUPERCEDES DWG. DATED 01/09/02

DRAWING NO. 79



PLAN - VIEW



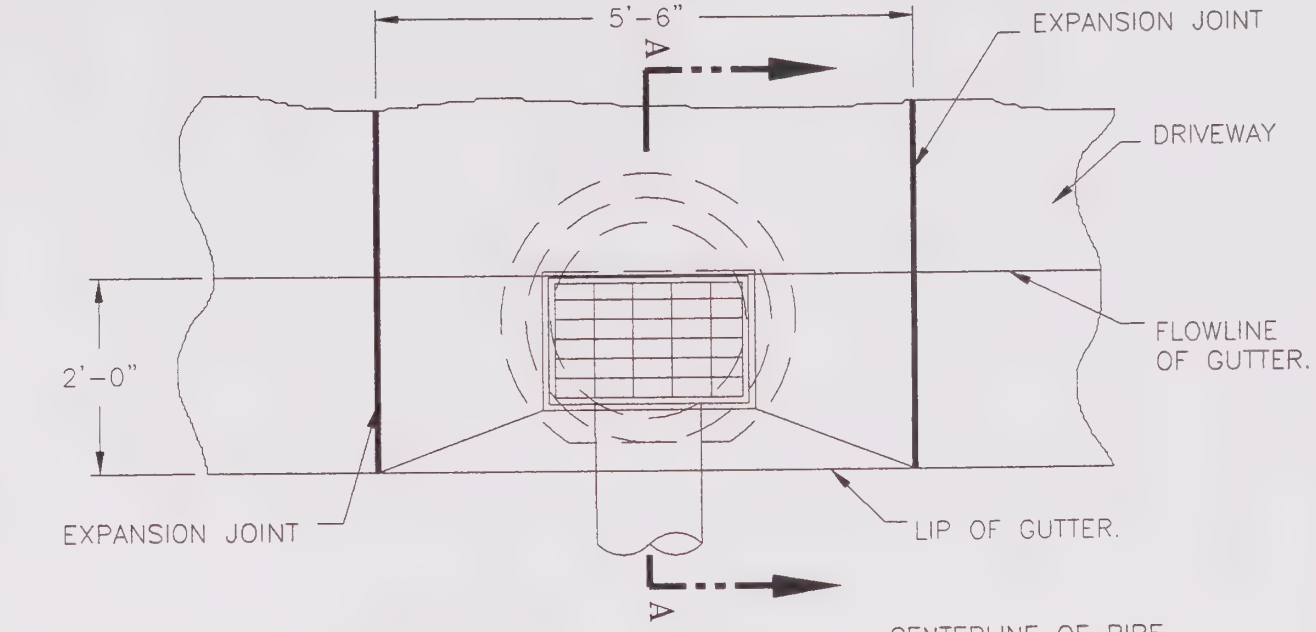
SECTION A-A

SECTION B-B

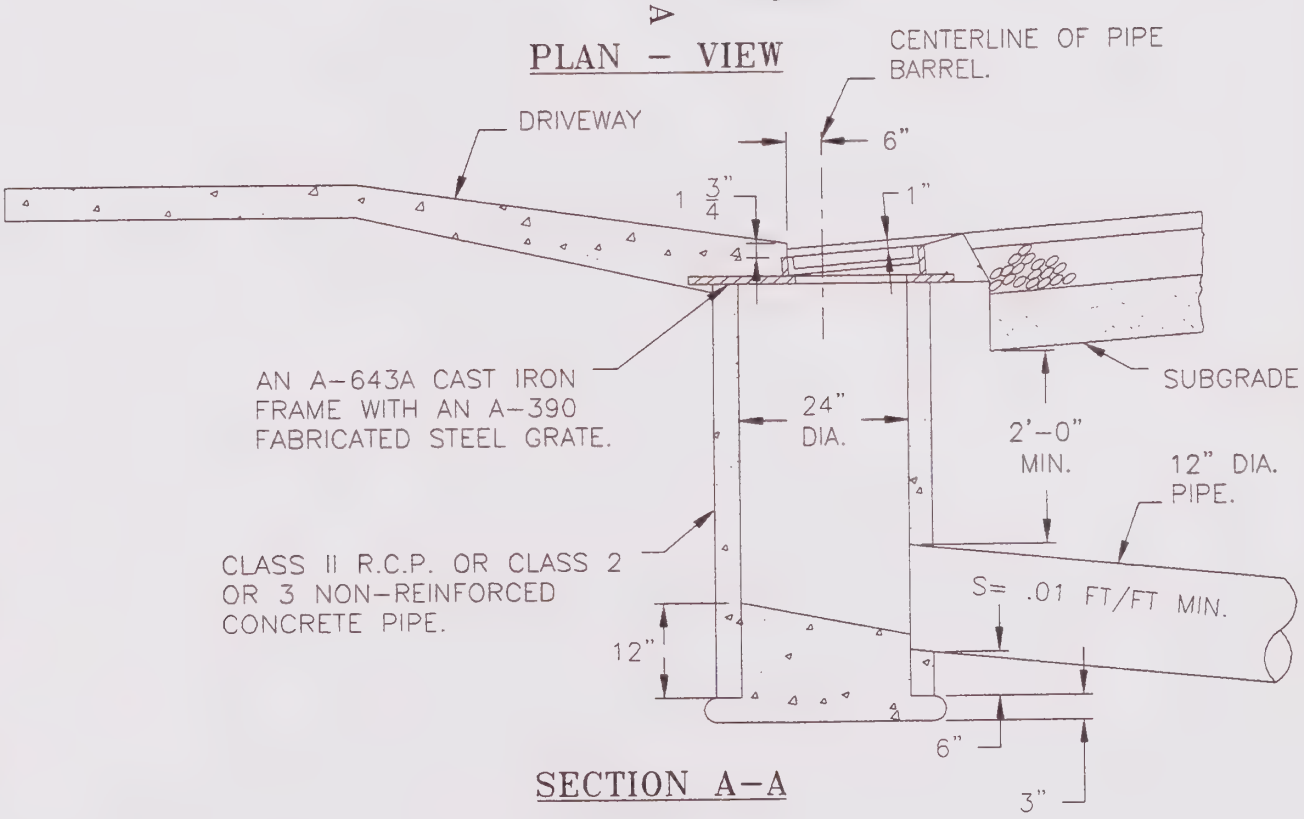
NOTES:

1. HOOD SHALL BE CAST IRON AND BE EQUAL TO AN A-285. FRAME AND GRATE SHALL BE EQUAL TO AN A-553 WITH CHAIN AND BLACK FINISH.
2. PRE CAST CONCRETE CATCH BASIN MAY BE USED WITH THE WRITTEN APPROVAL OF THE CITY ENGINEER.
3. CATCH BASIN WALLS MAY BE POURED TO AN ELEVATION NOT LESS THAN 2'-0" BELOW TOP OF CURB. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO FRAME IN AND POUR THE UPPER 2'-0" OF THE CATCH BASIN MONOLITHICALLY WITH THE CURB AND GUTTER.
4. ALL EXPOSED STEEL SHALL BE COATED WITH 2 COATS OF COAL TAR PITCH HEATED TO A MINIMUM OF 180°F OR GALVANIZED.
5. THIS CATCH BASIN TO BE INSTALLED IN INDUSTRIAL AND COMMERCIAL AREAS AS DIRECTED BY THE CITY ENGINEER.
6. TOP OF CURB SHALL BE STAMPED PER DWG. NO. 201H.

REV. NO.	REV. DATE	REV. BY	TYPE 2 CURB INLET CATCH BASIN	REVISION APPROVED BY CITY ENGINEER
3	6/1/2000	HL/EA		Finbarr J. O'Kegan
DIGITIZED	1/1/92			DATE: 11/25/03
DWG. BY RC	SCALE		CITY OF STOCKTON	SUPERCEDES DWG. DATED 01/09/02
CK. BY	NONE		DEPARTMENT OF PUBLIC WORKS	DRAWING NO. 80



PLAN - VIEW



SECTION A-A

NOTES:

1. ALL EXPOSED STEEL SHALL BE COATED WITH 2 COATS OF COAL TAR PITCH HEATED TO A MINIMUM OF 180°F OR GALVANIZED.
2. CHAIN GRATE TO FRAME.
3. GRATE SHALL BE DEPRESSED 1" BELOW GUTTER PROFILE GRADE.
4. TOP OF CURB SHALL BE STAMPED PER DWG. NO. 201H.

REV. NO.	REV. DATE	REV. BY
2	6/1/94	KB/DE
DIGITIZED	1/1/92	
DWG. BY RC	SCALE	
CK. BY	NONE	

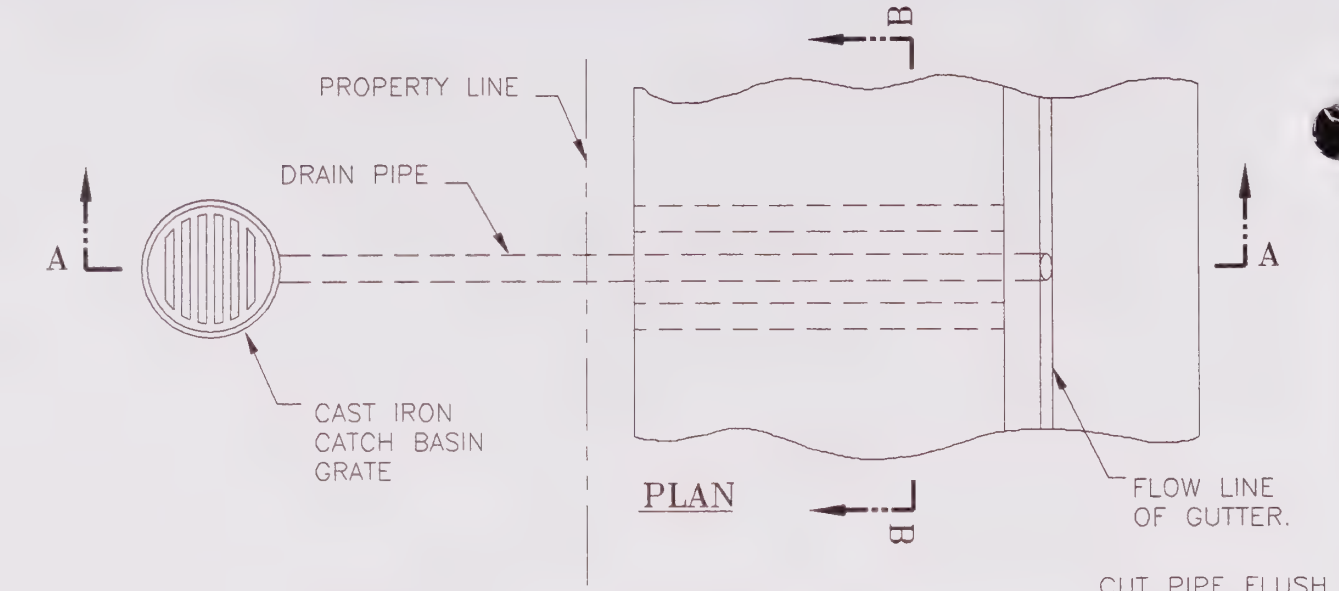
DRIVEWAY CATCH BASIN

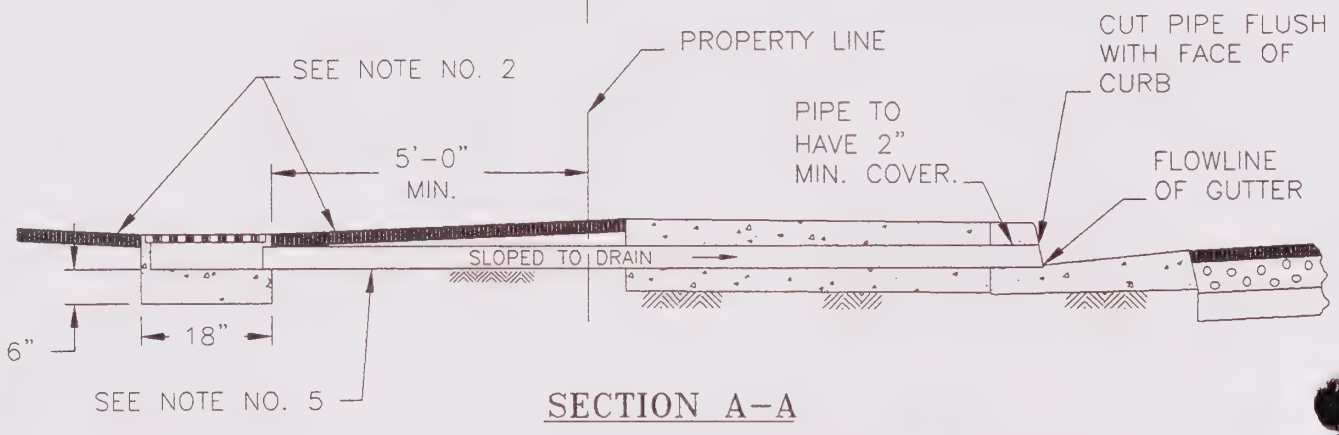
CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 01/09/02

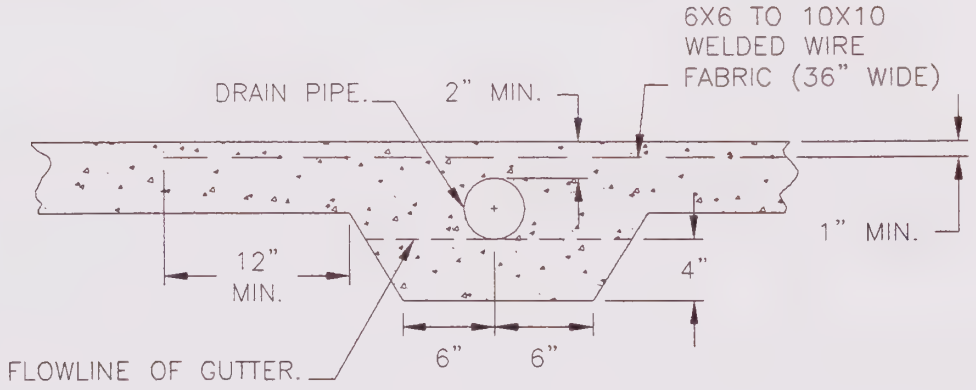
SUPERCEDES DWG. DATED 7/1/84

DRAWING NO. 80A





SECTION A-A



SECTION B-B

NOTES:

1. THIS INSTALLATION TO BE USED ONLY WITH APPROVAL OF THE CITY ENGINEER.
2. OWNER SHALL BE RESPONSIBLE FOR CLEANING AND MAINTAINING PIPE.
3. SEE STANDARD DWG NO. 40 FOR PAVEMENT STRUCTURAL SECTION.
4. ENCROACHMENT PERMIT REQUIRED FOR THIS INSTALLATION.
5. PIPE SHALL BE NON-BELL DUCTILE IRON OR 12 GAGE GALV. STEEL OR ABS OR SCHEDULE 40 PLASTIC PIPE.

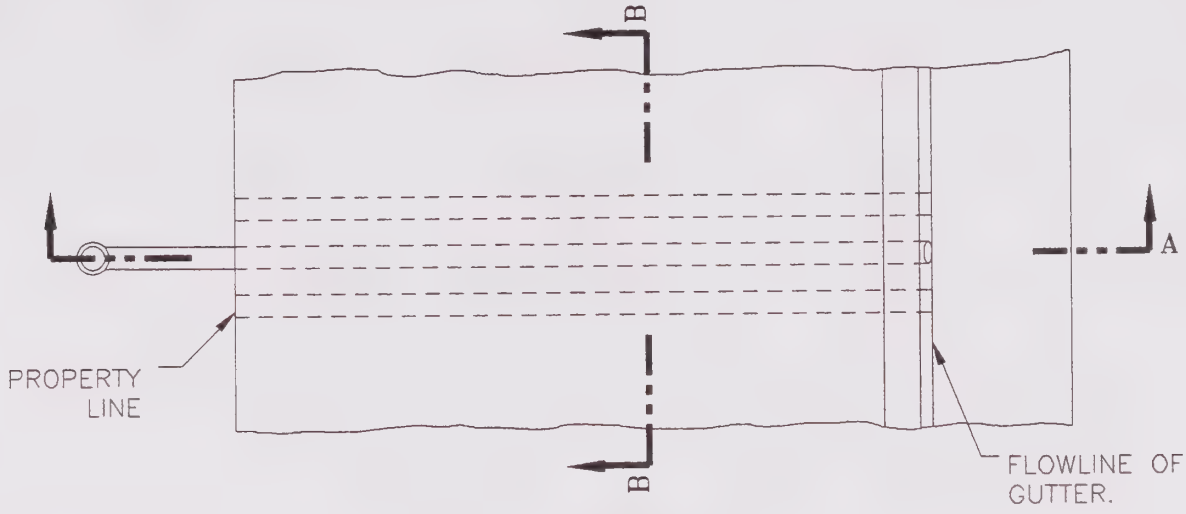
REV. NO.	REV. DATE	REV. BY
3	6/1/2000	HLE/RH
DIGITIZED	1/1/92	
DWG. BY	RC	SCALE
CK. BY		NONE

PARKING LOT AND UNDER SIDEWALK DRAIN

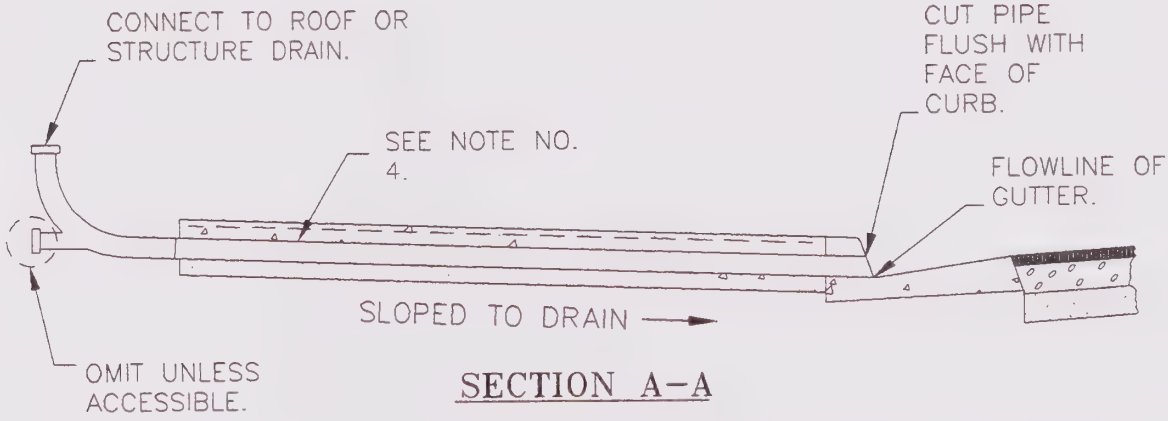
CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Rego
DATE: 01/09/02

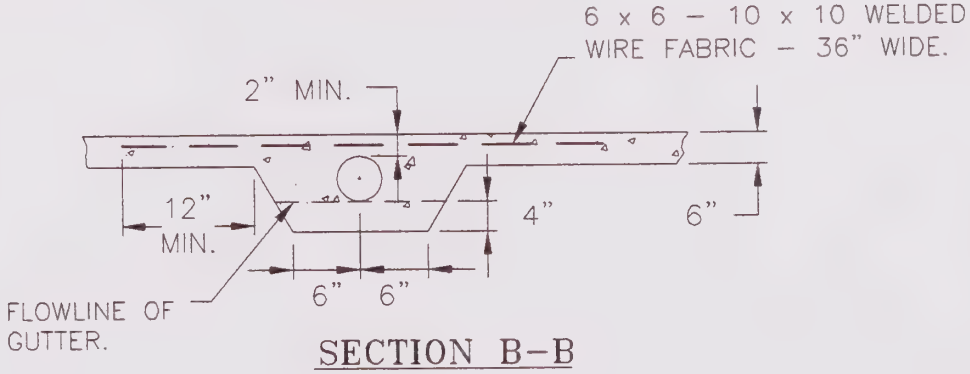
SUPERCEDES DWG. DATED	DRAWING NO.
10/7/93	81



PLAN



SECTION A–A



SECTION B–B

NOTES:

1. THIS INSTALLATION TO BE USED ONLY WITH THE APPROVAL OF THE CITY ENGINEER.
2. OWNER SHALL BE RESPONSIBLE FOR MAINTAINING AND CLEANING PIPE.
3. ENCROACHMENT PERMIT REQUIRED FOR THIS INSTALLATION.
4. PIPE SHALL BE NON–BELL DUCTILE IRON OR 12 GAGE GALV. STEEL OR ABS OR SCHEDULE 40 PLASTIC PIPE.

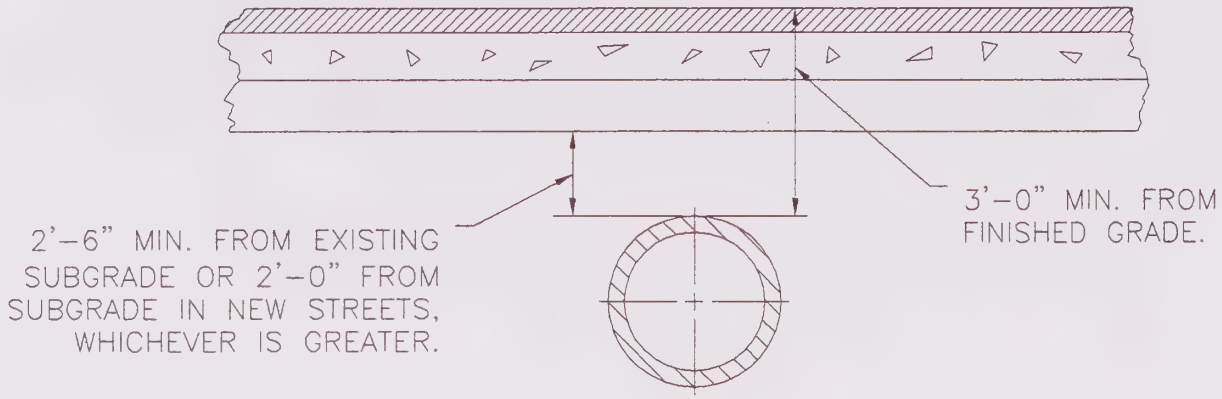
REV. NO.	REV. DATE	REV. BY
3	6/1/2003	HL/EA
DIGITIZED	1/1/92	
DWG. BY	RC	SCALE
CK. BY		NONE

UNDER SIDEWALK DRAIN FOR ROOF DRAINS

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 11/25/03

SUPERCEDES DWG. DATED	DRAWING NO.
1/9/02	82



NOTES:

1. 6" MIN. PIPE SIZE IS ACCEPTABLE ONLY IN RESIDENTIAL CUL–DE–SACS LESS THAN 400 FEET IN LENGTH AND WITHOUT FIRE HYDRANTS. CUL–DE–SACS GREATER THAN 400'–0" SHALL REQUIRE A MINIMUM 8" DIAMETER PIPE SIZE. 8" MIN. PIPE SIZE IS REQUIRED IN ALL OTHER AREAS.
2. ALL WATER DISTRIBUTION SYSTEMS SHALL BE LOOPED IN ALL AREAS EXCEPT CUL–DE–SACS UNLESS OTHERWISE APPROVED BY THE CITY ENGINEER. A NON–LOOPED WATER DISTRIBUTION SYSTEM MAY SERVE A MAXIMUM OF 25 RESIDENTIAL LOTS.
3. 10" AND 14" PIPES SHALL NOT BE ALLOWED. IF DESIGN CALCULATIONS RESULT IN DESIGNS USING 10" AND 14" PIPES, THEN 12" AND 16" PIPES, RESPECTIVELY, MUST BE USED.
4. 12" MIN. MAINS REQUIRED WHEN DISTANCE BETWEEN INTERCONNECTED LINES EXCEEDS 600'–0".
5. FIRE HYDRANT LOCATION AND PLACEMENT SHALL BE AT THE DIRECTION OF THE CITY OF STOCKTON FIRE DEPARTMENT.
6. AT ANY INTERCONNECTION OF THREE OR MORE PIPES, THE NUMBER OF VALVES REQUIRED SHALL EQUAL THE TOTAL NUMBER OF PIPES MINUS ONE.
7. VALVE SPACING ON TRANSMISSION LINES SHALL BE DETERMINED BY THE CITY ENGINEER. VALVES ON ALL OTHER LINES SHALL BE LOCATED SUCH THAT NO MORE THAN 600'–0" OF WATER LINE WILL BE SHUT DOWN AT ANY ONE TIME AND WILL NOT REQUIRE THE SHUT DOWN OF A PIPE SIZE 16" OR GREATER.
8. ALL WATER LINES, VALVES AND OTHER APPURTENANCES SHALL CONFORM TO A.W.W.A. AND CITY OF STOCKTON STANDARD SPECIFICATIONS AND DRAWINGS.

REV. NO.	REV. DATE	REV. BY
4	9/22/98	HLE/RH
DIGITIZED	1/1/92	
DWG. BY RC	SCALE	
CK. BY	NONE	

WATER DESIGN DATA

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 01/09/02

SUPERCEDES DWG. DATED	DRAWING NO.
11/8/80	90

(CONT'D FROM DWG. 90)

NOTES CONTINUED:

9. CONTRACTOR SHALL CALL CITY AND/OR PRIVATE WATER COMPANY IF ANY LINES ARE BROKEN. NO WATER VALVES SHALL BE SHUT OFF BY ANYONE UNLESS SO DIRECTED BY AN AUTHORIZED REPRESENTATIVE OF THE WATER COMPANY CONCERNED.
10. REFER TO THE RULES AND POLICIES OF THE OPERATING COMPANY OR CITY FOR METER CONNECTION.
11. MINIMUM CLEARANCE OF 4'–6" FROM THE GRADE AT BACK OF SIDEWALK TO WATER SERVICE. SEE DRAWING NO. 93.
12. WATER LINE ELEVATIONS TO BE SHOWN ON ALL PLAN AND PROFILE SHEETS.
13. WATER SYSTEM DESIGN SHALL CONFORM TO STATE HEALTH CODES. SEE STD. DWG NO. 47.
14. SERVICE TAPS SHALL NOT BE PERMITTED ON PIPE SIZES 16" AND GREATER.
15. SUBDIVISION WATER SYSTEMS SHALL BE DESIGNED USING AN ENGINEERING ANALYSIS THAT DEMONSTRATES:
    A. FOR ULTIMATE DEVELOPMENT OF THE SUBDIVISION, WITH A GIVEN SYSTEM PRESSURE OF 45 PSI AT THE POINT OF CONNECTION TO THE CITY WATER SYSTEM AND NO WELLS ON WITHIN THE SUBDIVISION, THE WATER SYSTEM IMPROVEMENTS SHALL PROVIDE AT LEAST 40 PSI PRESSURE AT ANY LOCATION DURING THE PERIOD OF PEAK HOUR DEMAND.
    B. FOR ULTIMATE BUILDOUT OF THE SUBDIVISION, WITH A GIVEN SYSTEM PRESSURE OF 45 PSI AT THE POINT OF CONNECTION TO THE CITY WATER SYSTEM AND NO WELLS ON WITHIN THE DEVELOPMENT, THE WATER SYSTEM IMPROVEMENTS SHALL PROVIDE AT LEAST 20 PSI PRESSURE AT ANY LOCATION DURING THE PERIOD OF MAXIMUM DAY DEMAND COMBINED WITH A FIRE FLOW OF 2000 GPM AT ANY LOCATION IN THE SUBDIVISION.
    C. FOR ANY PERIOD OF TIME DURING THE INTERIM PHASES OF DEVELOPMENT OF THE SUBDIVISION, WITH A GIVEN SYSTEM PRESSURE OF 45 PSI AT THE POINT OF CONNECTION TO THE CITY WATER SYSTEM AND NO WELLS ON WITHIN THE DEVELOPMENT, THE WATER SYSTEM IMPROVEMENTS SHALL PROVIDE AT LEAST 20 PSI PRESSURE AT ANY LOCATION DURING THE PERIOD OF MAXIMUM DAY DEMAND COMBINED WITH ONE FIRE FLOW OF 1500 GPM OUT OF ANY FIRE HYDRANT IN THE SUBDIVISION.
16. DEPTH OF PIPE SHALL BE 3'–0" MIN. FROM FINISHED GRADE, 2'–6" MIN. FROM EXISTING SUBGRADE, OR 2'–0" FROM SUBGRADE IN NEW STREETS WHICHEVER IS GREATER.

REV. NO.	REV. DATE	REV. BY
4	6/1/2000	HLE/RH
DIGITIZED	1/1/92	
DWG. BY RC	SCALE	
CK. BY	NONE	

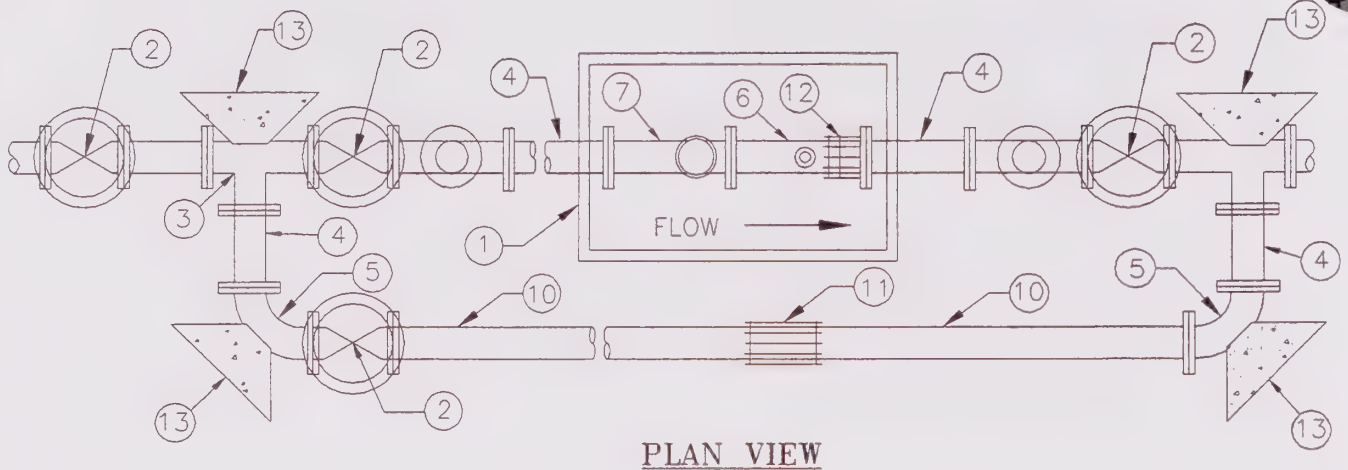
WATER DESIGN DATA

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

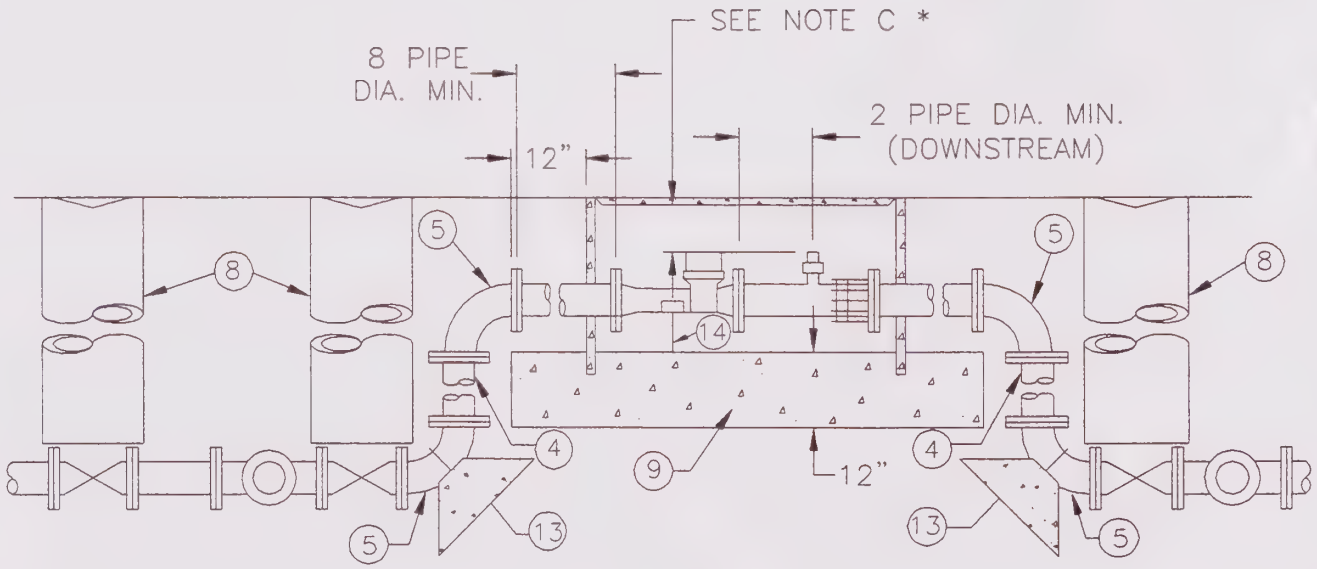
REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 01/09/02

SUPERCEDES DWG. DATED 2/23/95

DRAWING NO. 90A



PLAN VIEW



PROFILE VIEW

* FOR NOTES, SEE DWG. NO. 92A.

REV. NO.	REV. DATE	REV. BY	LAYOUT FOR 3" OR LARGER METER BY-PASS INSTALLATION	REVISION APPROVED BY CITY ENGINEER
5	6/1/2003	HL/EA		Finbarr J. O'Regan
DIGITIZED	7/1/91			DATE: 11/25/03
DWG. BY RC	SCALE		CITY OF STOCKTON	SUPERCEDES DWG. DATED 01/09/02
CK. BY	NONE		DEPARTMENT OF PUBLIC WORKS	DRAWING NO. 92

(CONT'D FROM DWG. 92)

COMPONENTS:

1. SIZE OF METER VAULT SHALL BE DETERMINED BY METER SIZE. VAULT COVERS SHALL BE 2 OR 3 PIECE METAL WITH READING LID CUT-IN POSITIONED OVER REGISTER.
2. VALVE - SEE STANDARD SPECIFICATION 76-1.02D.
3. CLASS 125 DUCTILE IRON PIPE TEE.
4. CLASS 125 DUCTILE IRON PIPE SPOOL.
5. CLASS 125 DUCTILE IRON PIPE 90° LONG RADIUS ELBOW.
6. CAST IRON TAPPED SPOOL OR TEE, FLANGE BY PLAIN END, WITH 2" BLIND FLANGED ACCESS.
7. METER AS SPECIFIED BY CITY WATER DIVISION.
8. CHRISTY G-8 VALVE BOX OR BROOKS NO. 1-RT VALVE BOX. BOTH WITH DUCTILE IRON PIPE COVERS. SEE DWG. NO. 99.
9. GRAVEL BASE. 12" MIN. DEPTH.
10. FLANGED BY PLAIN END CAST IRON PIPE. SEE STANDARD SPECIFICATION NO. 76-1.02B.
11. FLEX COUPLING - ROCKWELL 411 STEEL COUPLING OR EQUAL.
12. FLANGED COUPLING ADAPTER - ROCKWELL 912 OR EQUAL.
13. THRUST BLOCKS - SEE STANDARD SPECIFICATION 76-1.02H AND DWG. NO. 100.
14. METER AND PIPE SUPPORTS AS REQUIRED.

NOTES:

A. DETAILED DESIGN WILL BE REQUIRED AND SHALL BE APPROVED BY THE CITY ENGINEER PRIOR TO INSTALLATION.
B. BY-PASS REQUIREMENTS WILL BE DETERMINED BY THE CITY ENGINEER OR DEPUTY MUNICIPAL UTILITIES DIRECTOR/WATER & COLLECTION SYSTEMS.
C. DIMENSION SHALL VARY FROM 12" TO 24" DEPENDING ON METER AND SERVICE SIZE.

REV. NO.	REV. DATE	REV. BY
4	6/1/2000	HLE/RH
DIGITIZED	7/1/91	
DWG. BY RC	SCALE	
CK. BY	NONE	

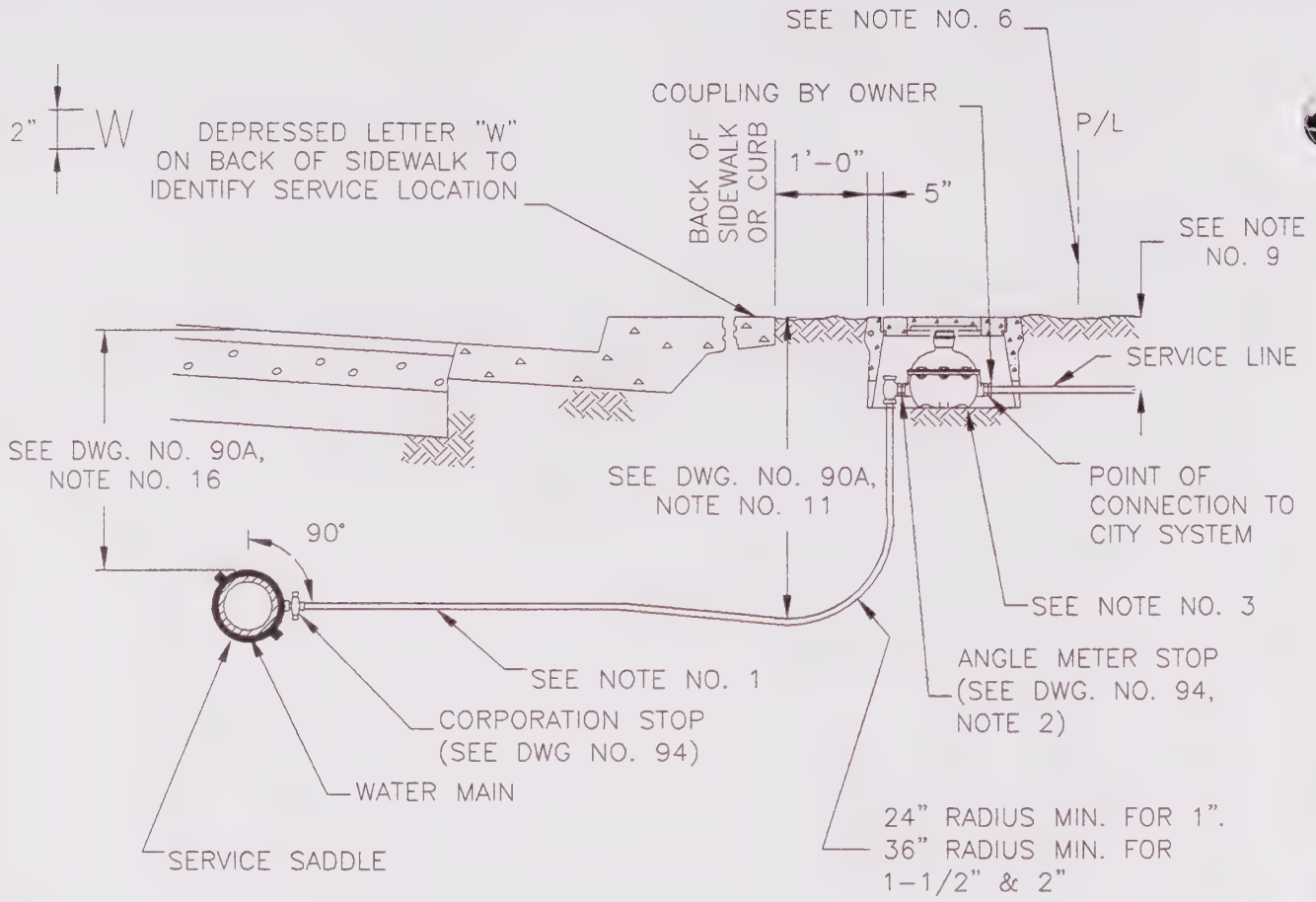
LAYOUT FOR 3" OR LARGER METER BY-PASS INSTALLATION

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 01/09/02

SUPERCEDES DWG. DATED 2/23/95

DRAWING NO. 92A



TYPICAL WATER SERVICE INSTALLATION FOR CITY WATER SERVICE AREAS ONLY

NOTES:

1. 1" DIA. MINIMUM LINE TO EACH LOT. PLASTIC SERVICE PIPE TO BE CONTINUOUS WITH NO SPLICING ALLOWED.
2. SEE DWG. NO. 94 AND 94A FOR FITTINGS AND BOX ASSEMBLY.
3. METERS SHALL BE FURNISHED AND INSTALLED BY CITY OF STOCKTON.
4. SERVICE CONNECTION AT THE METER SHALL BE A DEPTH OF 8" MIN. TO 12" MAX.
5. THE LOCATION OF THE TAP SHALL BE A MIN. OF 24" FROM ANOTHER TAP, BELL, SPIGOT, OR OTHER FITTING.
6. METER BOX MAY BE PLACED ADJACENT TO PROPERTY OR EASEMENT LINE WITH PRIOR APPROVAL OF THE CITY ENGINEER.
7. USE BROOKS NO. 37 METER BOX WITH NO. 37 TR/PL (TOUCH READ/PIT PROBE) COVER OR CHRISTY B-12 METER BOX WITH B12 TR/PL COVER. ALL BOXES LOCATED IN DRIVEWAY AREAS TO HAVE TRAFFIC COVERS MEET HS20 44 LOADING WITH TOUCH READ HOLE 1-3/4" DIA. HOLE FOR T/R METER IN UPPER RIGHT OR LOWER LEFT CORNER OF LID.
8. MAY REQUIRE INSTALLATION OF A BACKFLOW PREVENTION DEVICE PER CITY OF STOCKTON ORD. 93-0138, SECTION I.G OR AS UPDATED, AT THE DISCRETION OF MUNICIPAL UTILITY DEPARTMENT.
9. SERVICE LINES FROM ALL METERS TO PROPERTY LINES SHALL HAVE A MINIMUM OF 8" OF COVER FROM TOP OF SIDEWALK OR GROUND LINE.

REV. NO.	REV. DATE	REV. BY	WATER SERVICE INSTALLATION 1", 1.5", AND 2" SERVICE	REVISION APPROVED BY CITY ENGINEER
8	6/1/2003	HL/EA		Finbar J. O'Kegan
DIGITIZED	7/1/90			DATE: 11/25/03
DWG. BY RC	SCALE		CITY OF STOCKTON DEPARTMENT OF PUBLIC WORKS	SUPERCEDES DWG. DATED 01/09/02
CK. BY	NONE			DRAWING NO. 93

NOTE: SEE DWG'S. NO. 93 FOR DETAILS.

PLASTIC PIPE: (SEE SECTION OF SPECIFICATIONS REGARDING PLASTIC PIPE)

PLASTIC SERVICE PIPE SHALL BE ULTRA HIGH MOLECULAR WEIGHT (UHMW) P.E. 3406 CS 255-63, POLYETHYLENE (SEE COS 76-1.02J) AS MANUFACTURED BY WESTFLEX OR APPROVED EQUAL WITH MINIMUM PRESSURE RATING OF 160 P.S.I.

CONNECTION SHALL BE AS FOLLOWS:

1. CORPORATION STOPS

   A. 6 INCH DIAMETER LINES
   3/4" X 1" CORPORATION STOPS AS MANUFACTURED BY JAMES JONES (J-89 WITH J-2608 COMPRESSION ADAPTERS) COMPLETE WITH STAINLESS STEEL INSERTS FOR 1" I.D. PLASTIC PIPE.

   B. 8 AND 12 INCH DIAMETER LINES
   1" DIAMETER CORPORATION STOPS AS MANUFACTURED BY JAMES JONES (J-3402) COMPLETE WITH STAINLESS STEEL INSERTS FOR 1" I.D. PLASTIC PIPE.

   C. ALTERNATE PRODUCT SUPPLIER
   (1) 1" CORPORATION STOP. FORD NO. 1001 WITH SS INSERTS.
   (2) 3/4" X 1" CORPORATION STOP. FORD NO. 800 PLUS A C-16-44 COMPRESSION ADAPTER WITH SS INSERTS.
   (3) 1-1/2" AND 2" CORPORATION STOPS. FORD NO. FB-1000.

2. ANGLE METER STOPS

   A. 1 INCH DIAMETER ANGLE METER STOPS
   1" I.D. ANGLE METER STOP AS MANUFACTURED BY JAMES JONES (J-4202) COMPLETE WITH LOCK WING AND STAINLESS STEEL INSERT FOR 1" I.D. PLASTIC PIPE.

   B. 1-1/2 AND 2 INCH DIAMETER ANGLE METER STOPS
   ANGLE METER STOPS AS MANUFACTURED BY JAMES JONES (J-4205) SHALL BE USED WITH STAINLESS STEEL INSERTS.

   C. ALTERNATE PRODUCT SUPPLIER

   (1) 1" ANGLE METER STOP. FORD NO. KVP-3W WITH SS INSERT.
   (2) 1-1/2" ANGLE METER STOP. FORD FV 43-666 WITH SS INSERT.
   (3) 2" ANGLE METER STOP. FORD FV 43-777 WITH SS INSERT.

REV. NO.	REV. DATE	REV. BY	FITTINGS FOR WATER SERVICE	REVISION APPROVED BY CITY ENGINEER
3	6/1/2000	HLE/RH		Finbar J. O'Regan
DIGITIZED	1/1/92			DATE: 01/09/02
DWG. BY RC	SCALE		CITY OF STOCKTON	SUPERCEDES DWG. DATED 2/23/95 / DRAWING NO. 94
CK. BY	NONE		DEPARTMENT OF PUBLIC WORKS	

(CONT'D FROM DWG. 94)

CONNECTION SHALL BE AS FOLLOWS:

3. **SERVICE SADDLES**

ALL SERVICE SADDLES SHALL BE MANUFACTURED BY JAMES JONES (J-979) WITH DOUBLE FLAT BRONZE STRAPS AND BRONZE NUTS. SERVICE SADDLE FOR ALL SIZE C-900 MAINS SHALL BE MANUFACTURED BY JAMES JONES (J-996).

4. **WATER METER BOXES**

1" METER BOXES SHALL BE BROOKS NO. 37 OR CHRISTY B-12 BOX. FOR LIDS, SEE NOTE NO. 5.

1-1/2" AND 2" METER BOXES SHALL BE BROOKS NO. 66 OR CHRISTY B-36.

5. **WATER METER BOX COVER**

1" METER BOX COVER SHALL BE BROOKS NO. 37 TR/PL OR CHRISTY B-12 TR/PL COVER. ALL BOXES LOCATED IN DRIVEWAY AREAS TO HAVE TRAFFIC COVERS MEETING HS20 44 LOADING WITH TOUCH READ HOLE 1-3/4" DIA.

1-1/2" AND 2" METER BOXES SHALL HAVE BROOKS NO. 66 TR/PL OR CHRISTY B-36 TR/PL COVER. ALL BOXES LOCATED IN DRIVEWAY AREAS TO HAVE TRAFFIC COVERS MEETING HS20 44 LOADING WITH TOUCH READ HOLE 1-3/4" DIA.

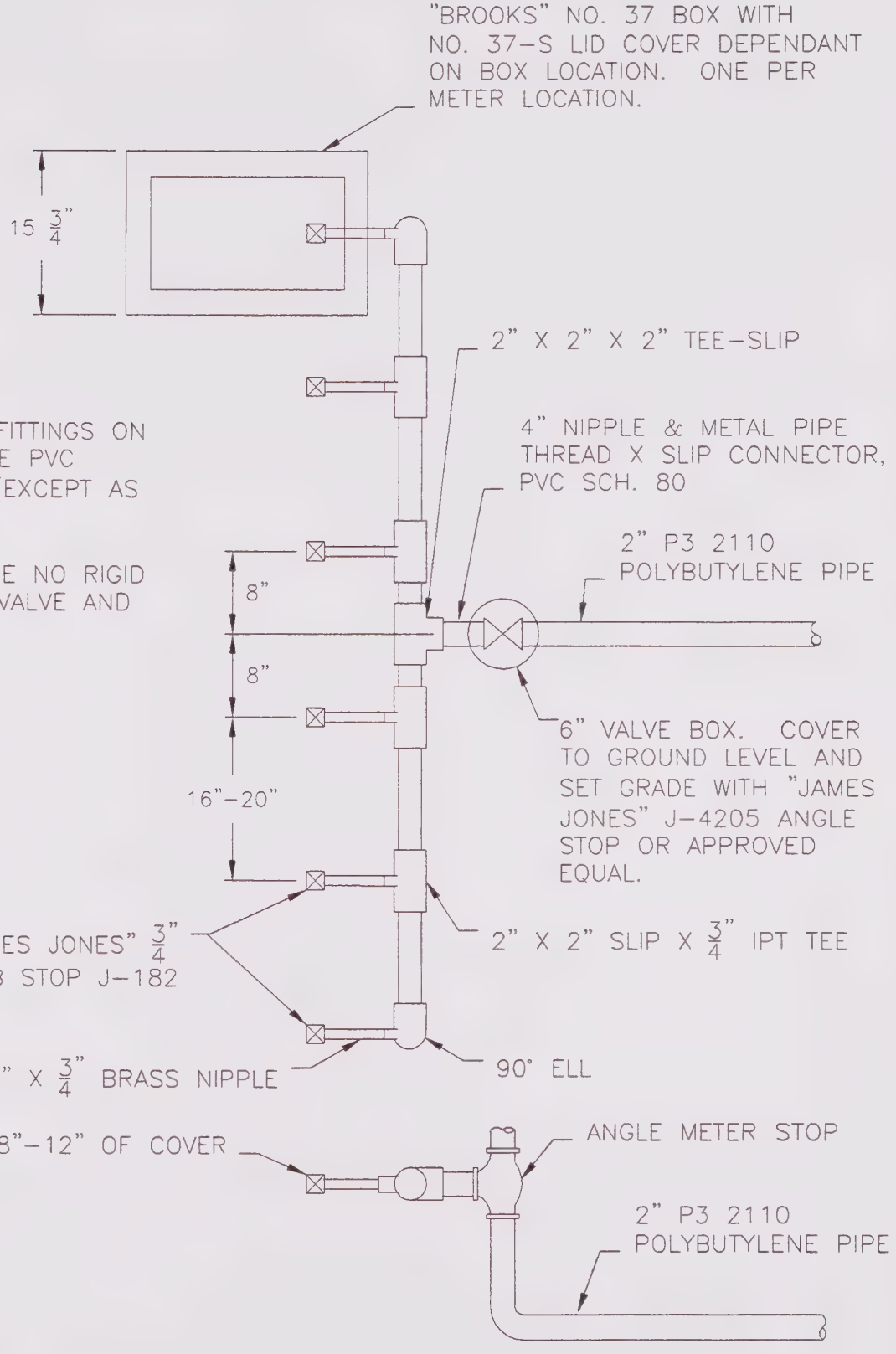
REV. NO.	REV. DATE	REV. BY
3	6/1/2000	HLE/RH
DIGITIZED	1/1/92	
DWG. BY	RC	SCALE
CK. BY		NONE

FITTINGS FOR WATER SERVICE

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 01/09/02

SUPERCEDES DWG. DATED	DRAWING NO.
2/23/95	94A



NOTES:

ALL PIPE AND FITTINGS ON MANIFOLD TO BE PVC SCHEDULE 80 (EXCEPT AS NOTED).

THERE SHALL BE NO RIGID PIPE BETWEEN VALVE AND MAIN.

REV. NO.	REV. DATE	REV. BY
5	6/1/2000	HLE/RH
DIGITIZED	1/1/92	
DWG. BY RC	SCALE	
CK. BY	NONE	

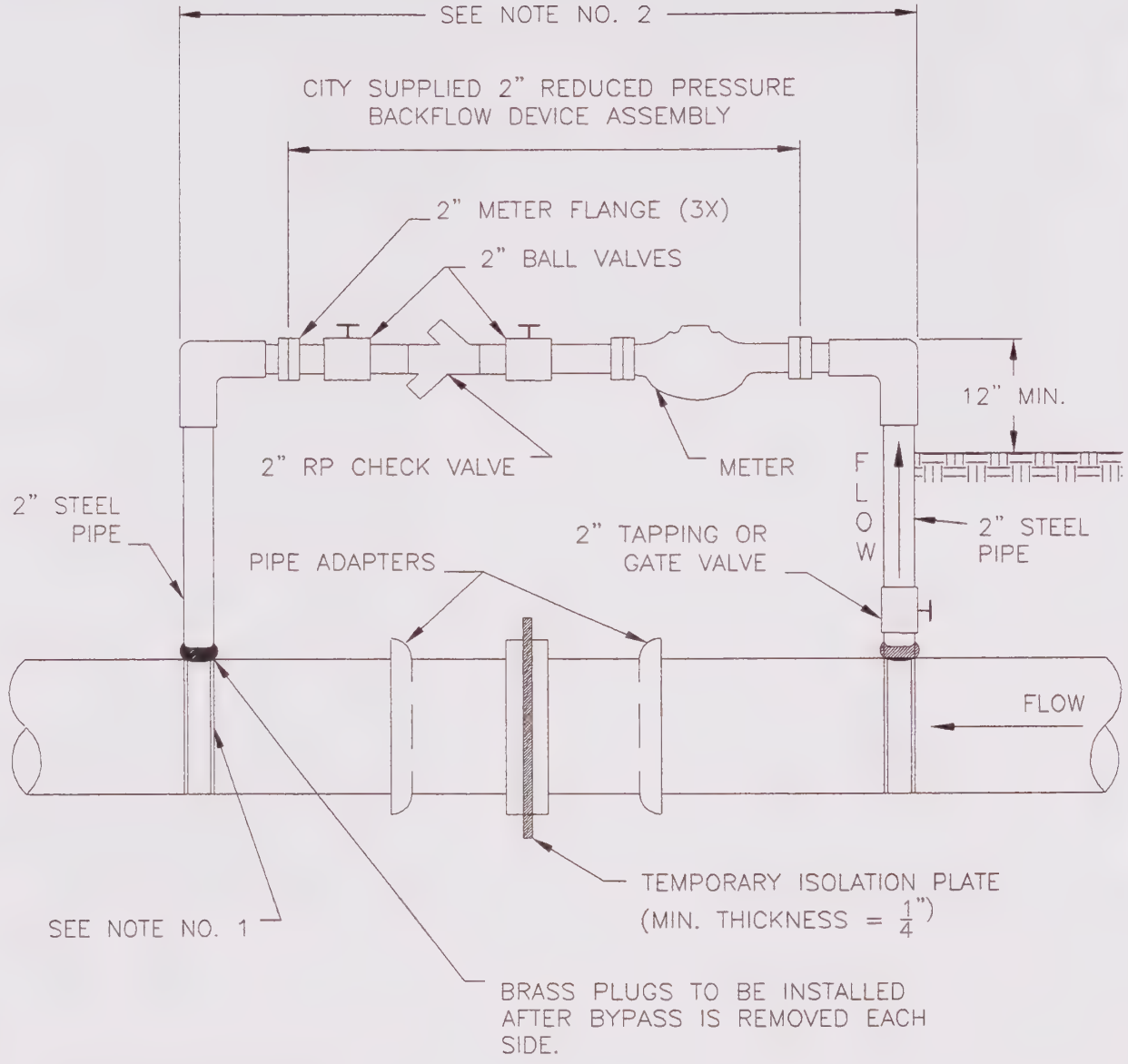
MULTIPLE UNIT METER SERVICE

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 01/09/02

SUPERCEDES DWG. DATED 6/1/94

DRAWING NO. 95



NOTES:

1. TAP NOT TO BE MADE CLOSER THAN 18" FROM END OF PIPE.
2. LENGTH TO BE AS NEEDED TO ACCOMMODATE SPECIFIED FITTINGS. (THE CITY SUPPLIED ASSEMBLY IS APPROXIMATELY 34" TO 36").

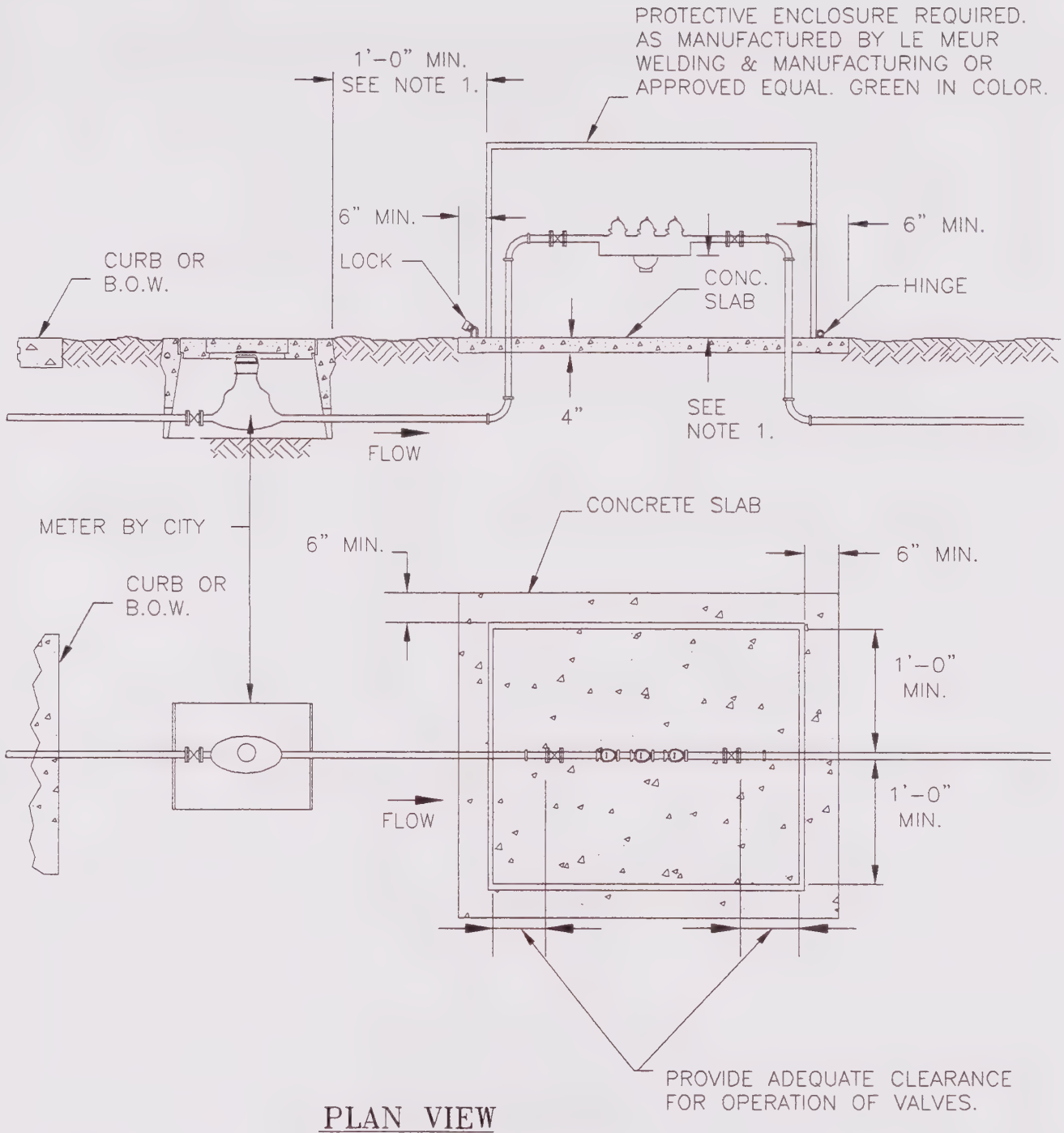
REV. NO.	REV. DATE	REV. BY
1	6/1/2000	HLE/RH
DIGITIZED	6/1/94	
DWG. BY HD	SCALE	
CK. BY	NONE	

ISOLATION OF NEW MAINS (18" AND SMALLER)

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

NEW DRAWING APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 01/09/02

SUPERCEDES DWG. DATED	DRAWING NO.
6/1/94	96



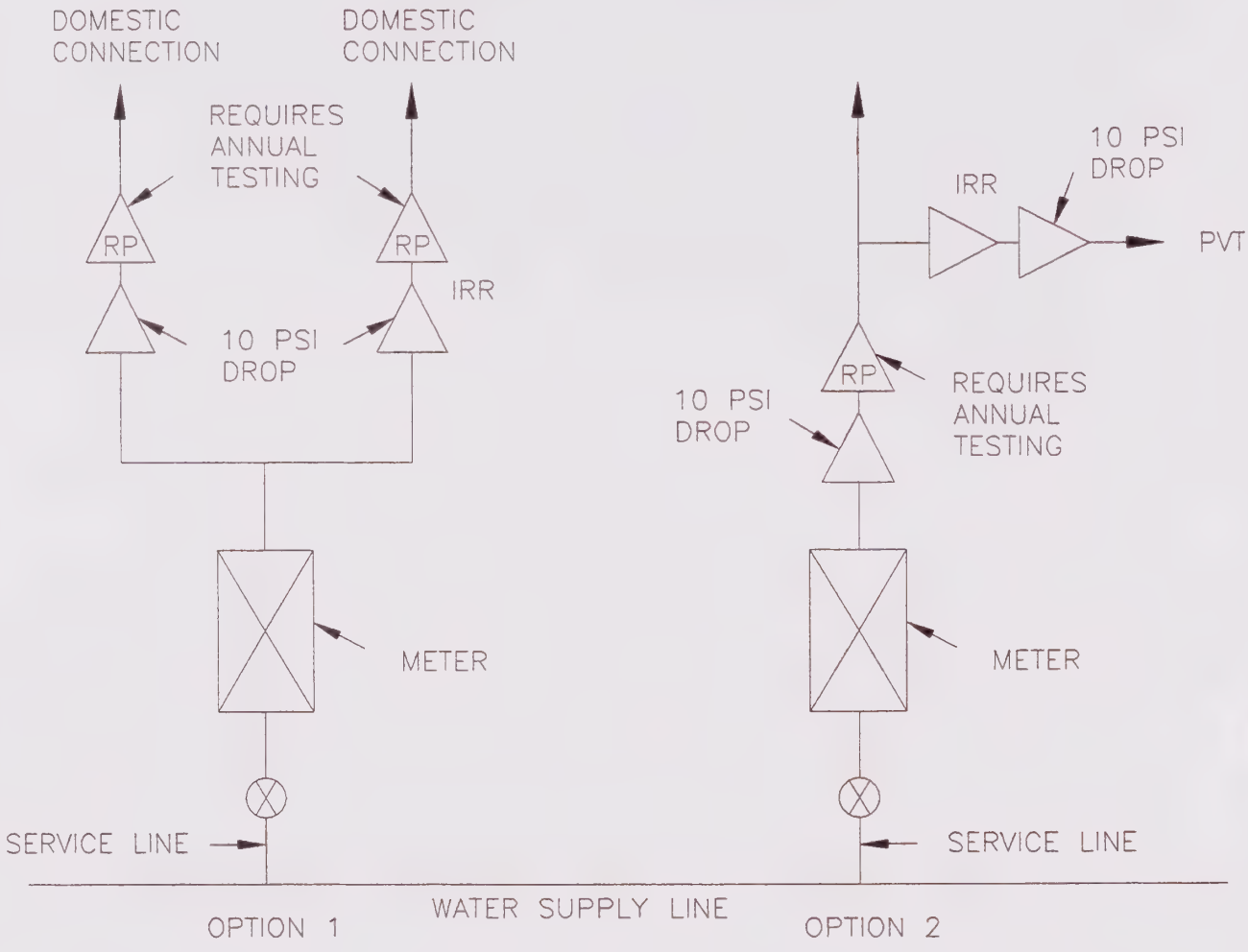
PLAN VIEW

NOTES:

1. A REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTION DEVICE SHALL BE LOCATED AS CLOSE AS PRACTICAL TO THE USER'S CONNECTION AND SHALL BE INSTALLED A MINIMUM OF TWELVE INCHES (12") ABOVE GRADE AND NOT MORE THAN THIRTY-SIX INCHES (36") ABOVE GRADE, MEASURED FROM THE BOTTOM OF THE DEVICE, AND WITH A MINIMUM OF TWELVE INCHES (12") SIDE CLEARANCE.
2. INSTALLATIONS SHALL MEET ALL REQUIREMENTS OF THE STATE CODE TITLE 17.

REV. NO.	REV. DATE	REV. BY	TYPICAL INSTALLATIONS FOR BACK FLOW PREVENTION DEVICES (IRRIGATION INSTALLATION)	NEW DRAWING APPROVED BY CITY ENGINEER Finbarr J. O'Regan DATE: 11/25/03	
3	6/1/2003	HL/EA			
DIGITIZED	6/9/93				
DWG. BY	SA	SCALE	CITY OF STOCKTON DEPARTMENT OF PUBLIC WORKS	SUPERCEDES DWG. DATED 01/09/02	DRAWING NO. 97
CK. BY		NONE			

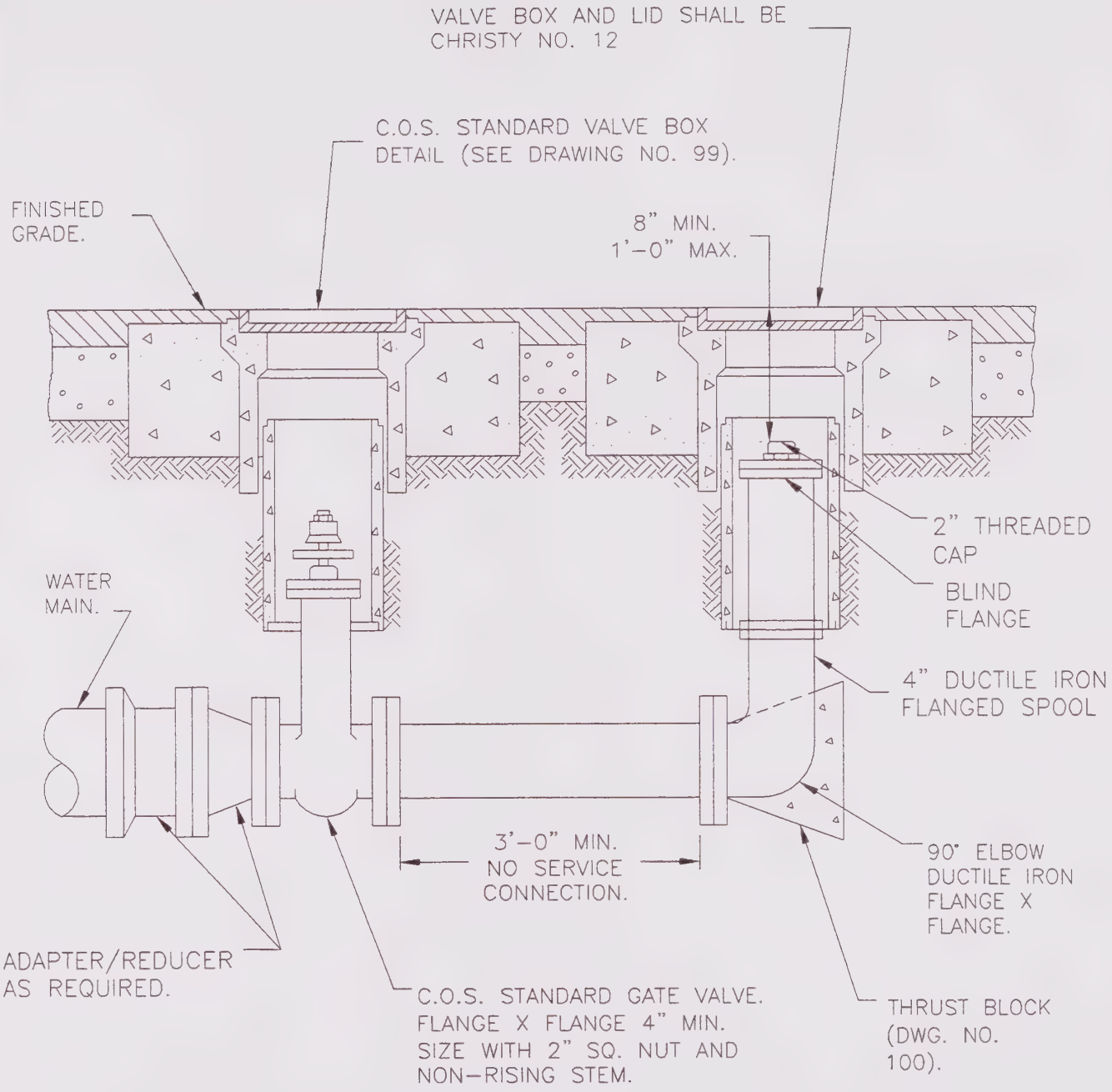
STANDARDS FOR BACKFLOW INSTALLATION



NOTES:

1) OPTION 2 IS ALLOWED ONLY WITH THE APPROVAL OF THE CITY OF STOCKTON MUNICIPAL UTILITIES DEPARTMENT.

REV. NO.	REV. DATE	REV. BY	BACKFLOW INSTALLATION	REVISION APPROVED BY CITY ENGINEER: Finbar J. O'Regan DATE: 11/25/03
DIGITIZED 3/20/2003				
DWG. BY AST	SCALE		CITY OF STOCKTON DEPARTMENT OF PUBLIC WORKS	SUPERCEDES DWG. DATED: DRAWING NO. 97A
CK. BY	NONE			



REV. NO.	REV. DATE	REV. BY
5	6/1/2003	HL/EA
DIGITIZED	7/1/90	
DWG. BY RC	SCALE	
CK. BY	NONE	

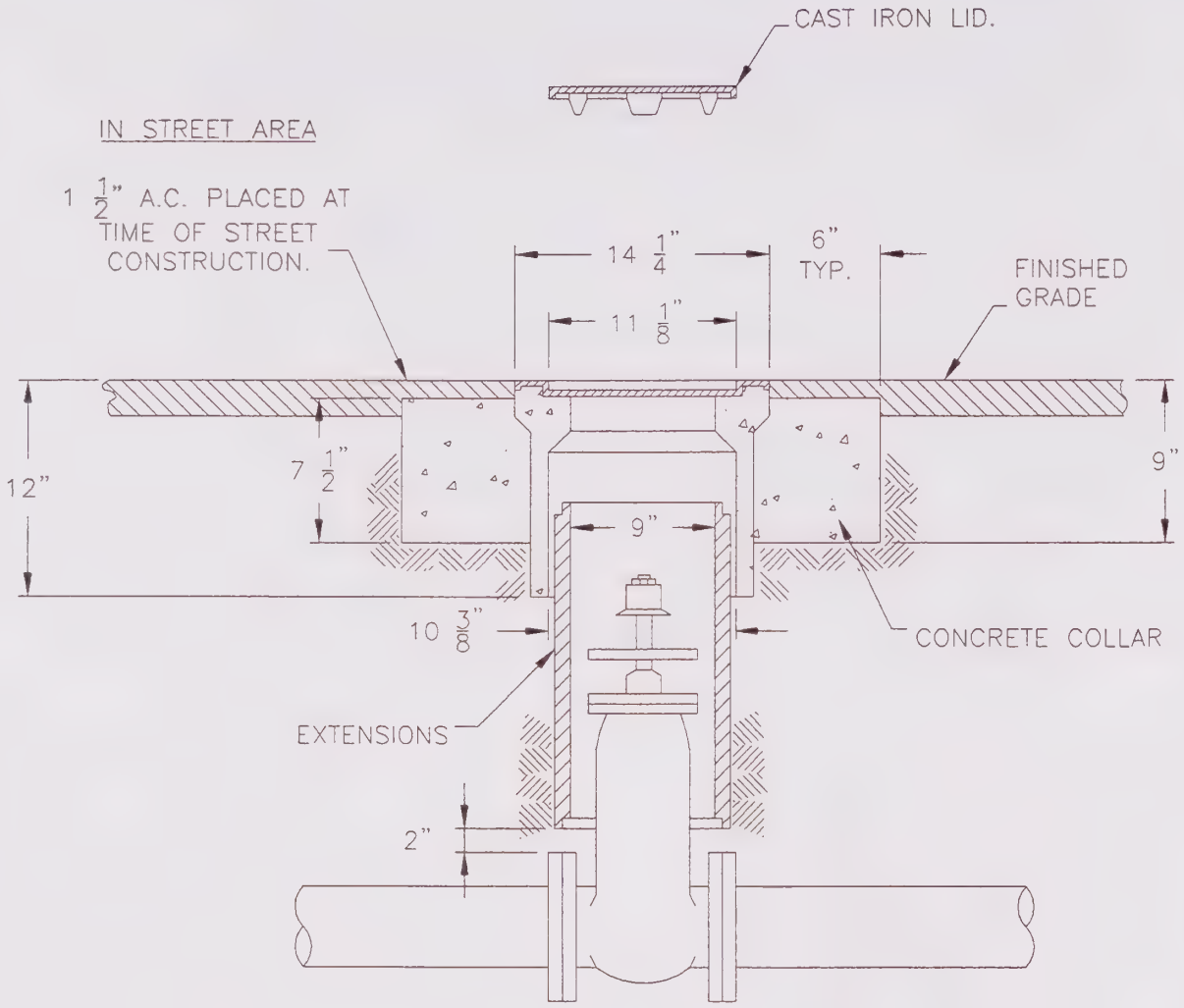
BLOW-OFF

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 11/25/03

SUPERCEDES DWG. DATED 01/09/02

DRAWING NO. 98



NOTES:

1. VALVE BOX AND LID SHALL BE CHRISTY NO. G5 OR EQUAL.
2. ALL LIDS SHALL HAVE MACHINED SEATING SURFACES.
3. EXTENSIONS SHALL BE C900 PVC WATER PIPE OR SDR 35 PVC SEWER PIPE. EXTENSIONS SHALL BE ONE CONTINUOUS PIECE.
4. FOR BLOWOFF INSTALLATION, REFER TO DRAWING NO. 98.
5. CONCRETE COLLAR NOT REQUIRED WHEN VALVE BOX IS LOCATED IN CONCRETE SIDEWALK AREA.

REV. NO.	REV. DATE	REV. BY
5	6/1/2000	HLE/RH
DIGITIZED	7/1/91	
DWG. BY RC	SCALE	
CK. BY	NONE	

VALVE BOX DETAILS

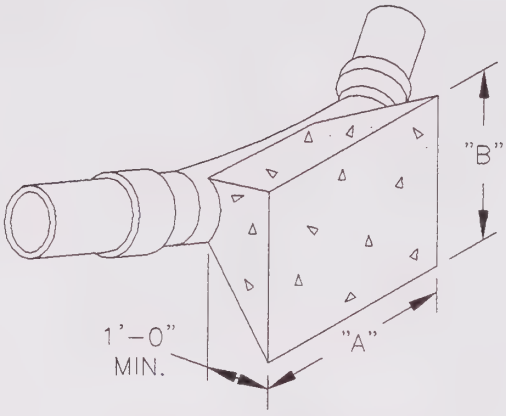
CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbarr J. O'Regan
DATE: 01/09/02

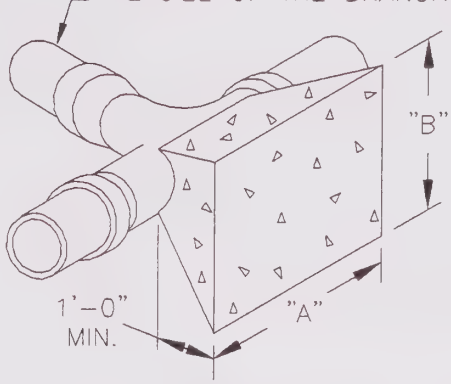
SUPERCEDES DWG. DATED 6/1/94

DRAWING NO. 99

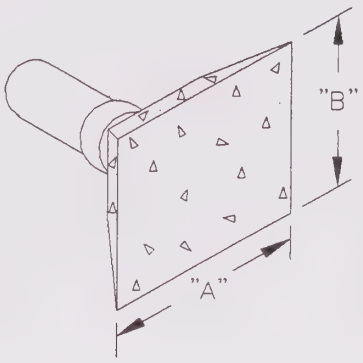
THRUST BLOCK AREA IS BASED ON THE SIZE OF THE BRANCH LINE.



TYPICAL THRUST BLOCK
BEND

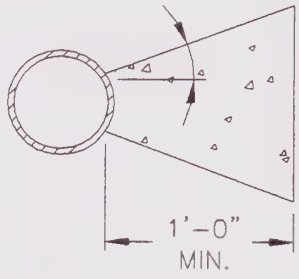


TYPICAL THRUST BLOCK
TEE OUTLET



TYPICAL THRUST BLOCK
DEAD END

45° MAX. (TYP. FOR ALL ANGLES).



TYPICAL SECTION THRU THRUST BLOCK

THRUST BLOCK AREA REQUIRED		
FITTINGS	ALLOWABLE SOIL BEARING VALUE 1000 LBS. PER SQ. FT.	
6" LINE OR SMALLER	"A"	"B"
22 1/2°	1'-6"	1'-6"
45°	2'-0"	2'-0"
90°	3'-0"	2'-6"
TEE OUTLET	2'-6"	2'-0"
DEAD END	2'-6"	2'-0"
8" LINE		
22 1/2°	2'-0"	2'-0"
45°	3'-0"	2'-6"
90°	4'-0"	3'-0"
TEE OUTLET	3'-0"	3'-0"
DEAD END	3'-0"	3'-0"
10" LINE		
22 1/2°	3'-0"	2'-0"
45°	3'-6"	3'-0"
90°	5'-0"	4'-0"
TEE OUTLET	4'-0"	3'-6"
DEAD END	4'-0"	3'-6"
12" LINE		
22 1/2°	3'-0"	3'-0"
45°	4'-0"	4'-0"
90°	7'-0"	4'-0"
TEE OUTLET	5'-0"	4'-0"
DEAD END	5'-0"	4'-0"

NOTES:

1. ALL THRUST BLOCKS SHALL BE POURED AGAINST UNDISTURBED SOIL.
2. RESTRAINT SYSTEM FOR VERTICAL PIPE BENDS SHALL BE APPROVED BY THE CITY ENGINEER.
3. THRUST RESTRAINT SYSTEMS FOR PIPES LARGER THAN 12" SHALL BE DESIGNED ON A CASE BY CASE BASIS AND SHALL BE APPROVED BY THE CITY ENGINEER.

REV. NO.	REV. DATE	REV. BY
3	10/7/93	SA
DIGITIZED	1/1/92	
DWG. BY RC	SCALE	
CK. BY	NONE	

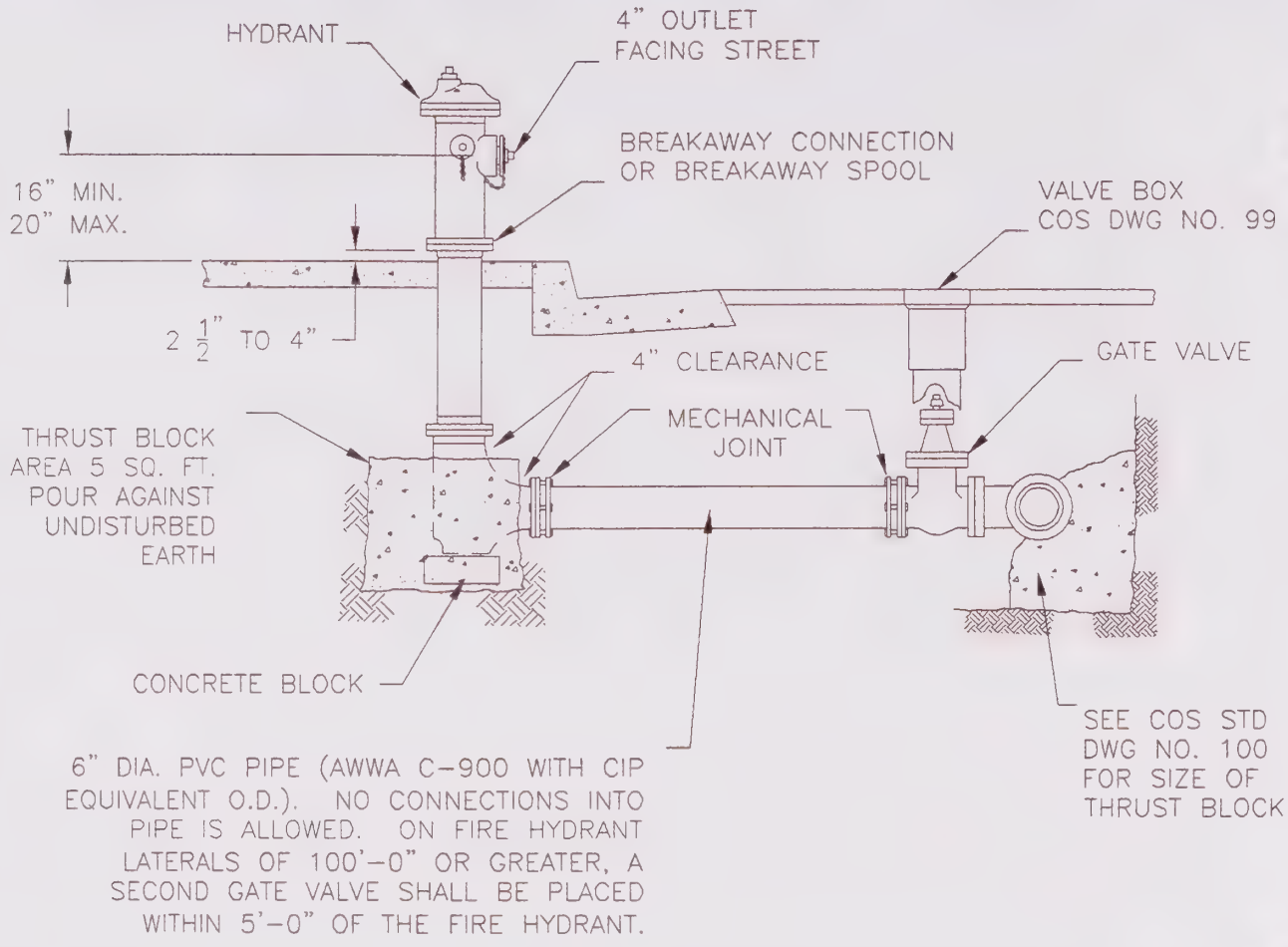
THRUST BLOCK DETAILS

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 01/09/02

SUPERCEDES DWG. DATED 7/1/89

DRAWING NO. 100



HYDRANTS

CLOW "MEDALLION" AMERICAN DARLING MODEL B-62B, KENNEDY GUARDIAN K81A MUELLER "CENTURION", "MODERN CENTURION" M&H VALVE CO. STYLE 129 WATEROUS PACER. (2) 2-1/2" AND (1) 4" NST OUTLETS (OPEN COUNTERCLOCKWISE). 1-1/4" PENTAGON OPERATING AND CAP NUTS. DRIP PLUGS, IF ANY, SHALL BE PLUGGED. HYDRANTS SHALL BE LOCATED AT P/L EXTENSION, AT END OF CURB RETURN, 3' MIN. FROM DRIVEWAYS OR AS SHOWN ON PLANS.

HYDRANT "T" TO DUCTILE IRON PIPE OR PVC C-900 FOR NEW DEVELOPMENT

CITY WATER SYSTEM:
RING TITE BY RING TITE BY FLANGE.
CALIFORNIA WATER SERVICE CO.:
GRIP TITE BY GRIP TITE BY FLANGE.

CONTACT RESPECTIVE WATER SYSTEM REGARDING CONNECTION TO PIPE BY OTHER MATERIAL.

GATE VALVES

CLOW "RESILIENT WEDGE"
MUELLER "RESILIENT SEAT"
AMERICAN DARLING
KENNEDY RESILIENT
WATEROUS SERIES 500

REV. NO.	REV. DATE	REV. BY
3	6/1/2000	HLE/RH
DIGITIZED	7/1/90	

FIRE HYDRANT

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Rega
DATE: 01/09/02

DWG. BY	RC	SCALE
CK. BY		NONE

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

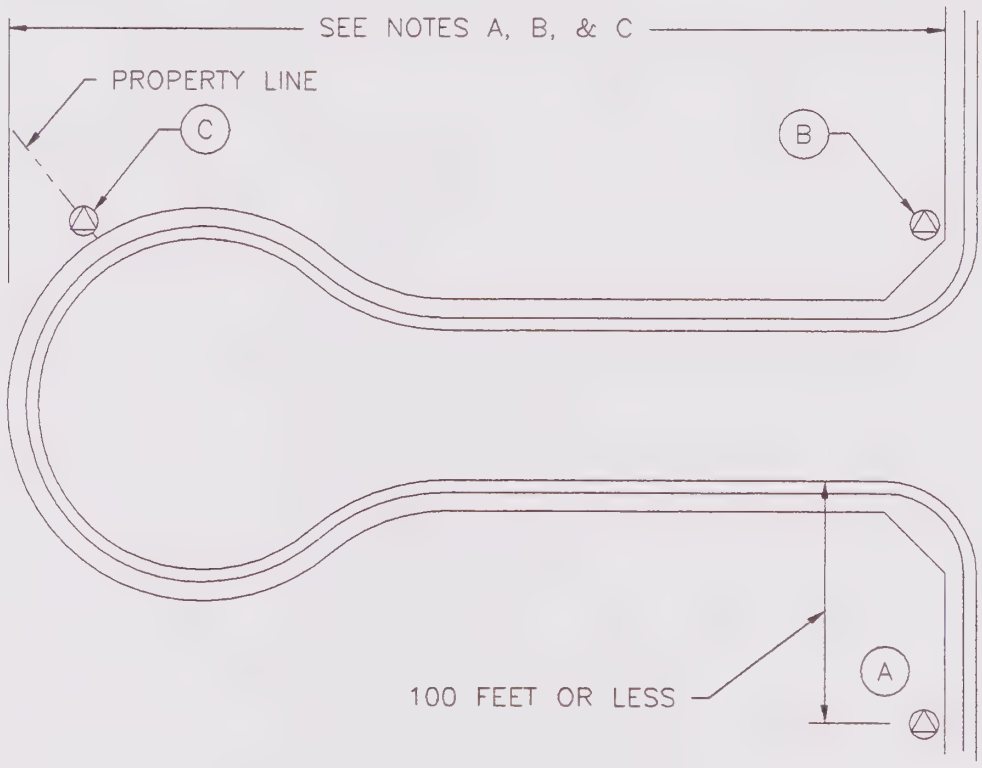
SUPERCEDES DWG. DATED	DRAWING NO.
10/7/93	101

IF THE LENGTH OF THE CUL-DE-SAC IS:

A. LESS THAN 250'-0",
THEN THE FIRE HYDRANT SHALL BE PLACED WITHIN 100'-0" OF THE CUL-DE-SAC ENTRANCE AND NO FIRE HYDRANT SHALL BE PLACED IN THE CUL-DE-SAC (SEE LOCATION A, BELOW).

B. GREATER THAN 250'-0" BUT LESS THAN 400'-0",
THEN THE FIRE HYDRANT SHALL BE PLACED AT THE CUL-DE-SAC ENTRANCE AND NO FIRE HYDRANT SHALL BE PLACED IN THE CUL-DE-SAC (SEE LOCATION B, BELOW).

C. GREATER THAN 400'-0",
THEN THE FIRE HYDRANT SHALL BE PLACED AT THE PROPERTY LINE (SEE LOCATION C BELOW).



FIRE HYDRANT LOCATION ON CUL-DE-SACS

NOTES:

1. FIRE HYDRANTS SHALL BE LOCATED ON ALL REQUIRED ACCESS ROADWAYS AND CITY STREETS ACCORDING TO THE FOLLOWING REQUIREMENTS:
   a) 300'-0" ON CENTER FOR ALL COMMERCIAL/INDUSTRIAL PROPERTIES.
   b) 400'-0" ON CENTER FOR GROUP R-1 OCCUPANCIES AS DEFINED IN THE UBC (UNIFORM BUILDING CODE).
   c) 600'-0" ON CENTER FOR GROUP R-3 OCCUPANCIES AS DEFINED IN THE UBC (UNIFORM BUILDING CODE).
2. DOG-LEGGED CUL-DE-SACS REQUIRE FIRE HYDRANT(S) TO BE LOCATED BY THE FIRE MARSHAL.

REV. NO.	REV. DATE	REV. BY
2	6/1/2000	HLE/RH
DIGITIZED	1/1/92	
DWG. BY	RC	SCALE
CK. BY	NS	NONE

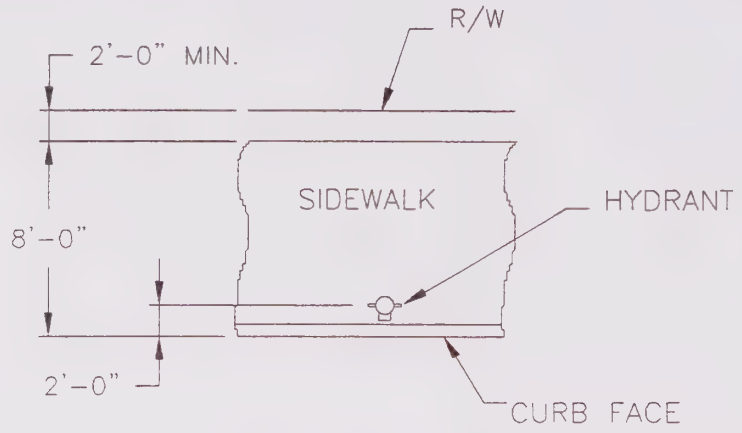
FIRE HYDRANT SPACING

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

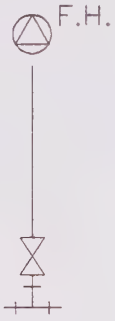
DIGITIZED VERSION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 01/09/02

SUPERCEDES DWG. DATED 2/23/95

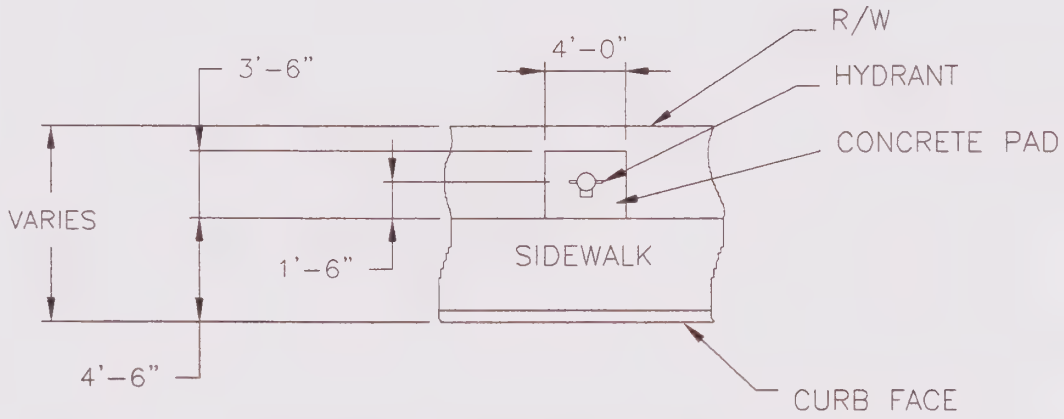
DRAWING NO. 101A



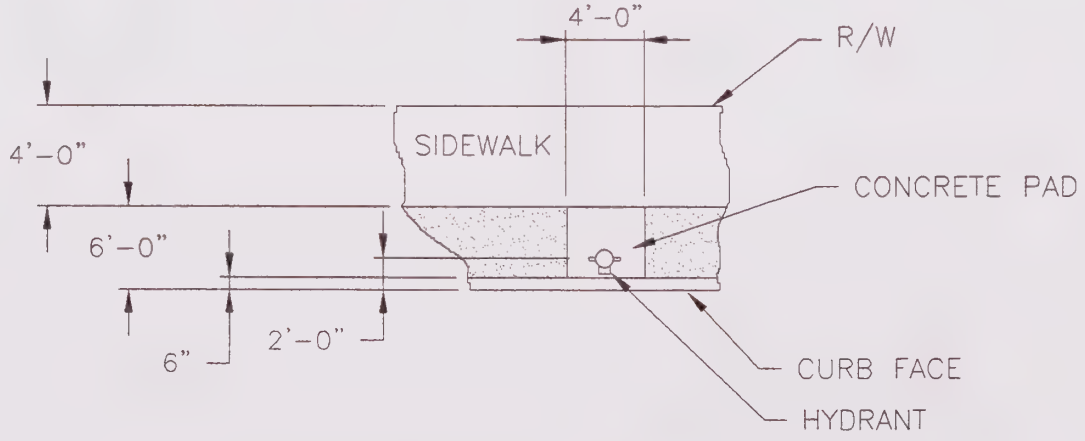
COMMERCIAL



SYMBOL ON PLANS



WITHOUT PLANTER STRIP



WITH PLANTER STRIP

REV. NO.	REV. DATE	REV. BY		REVISION APPROVED BY CITY ENGINEER
4	6/1/2003	HL/EA	FIRE HYDRANT LOCATION	Finbar J. O'Kega
DIGITIZED	7/1/90			DATE: 11/25/03
DWG. BY RC	SCALE		CITY OF STOCKTON	SUPERCEDES DWG. DATED 01/09/02
CK. BY	NONE		DEPARTMENT OF PUBLIC WORKS	DRAWING NO. 101B

STANDARDS FOR FIRE PROTECTION SYSTEMS

GENERAL:

1. ALL PRIVATE UNDERGROUND FIRE SYSTEMS, INCLUDING HYDRANT SYSTEMS AND UNDERGROUND MAINS FOR SPRINKLER SYSTEMS AND FIRE PUMPS SERVING SPRINKLER SYSTEMS, CROSS-CONNECTED TO UNAPPROVED WATER SOURCES AND CONNECTED TO DOMESTIC WATER MAINS SHALL HAVE BACKFLOW PREVENTION AS REQUIRED BY AWWA M-14 FOR CLASSES III, IV, V AND VI FIRE SYSTEMS.
2. PLANS SHALL BE SUBMITTED FOR APPROVAL BY THE FIRE DEPARTMENT AND CITY MUNICIPAL UTILITIES DEPARTMENT PRIOR TO CONSTRUCTION. "AS BUILT" DRAWINGS SHALL BE PROVIDED PRIOR TO CONSTRUCTION TO THE PUBLIC WATER SYSTEM. (THE SAME PLAN SUBMITTAL REQUIREMENTS APPLY TO INSTALLATIONS CONNECTED TO CALIFORNIA WATER SERVICE COMPANY MAINS.)
3. ALL UNDERGROUND FIRE PROTECTION SYSTEMS SHALL BE DISINFECTED PRIOR TO CONNECTING TO PUBLIC WATER SYSTEM IN ACCORDANCE WITH CITY OF STOCKTON STANDARD SPECIFICATION SECTION 76.
4. WITHIN THE CITY WATER SERVICE AREA, ALL ON-SITE FIRE HYDRANT SYSTEMS 300'-0" OR MORE FROM THE PROPERTY LINE SHALL HAVE A DETECTOR CHECK LOCATED AT THE PROPERTY LINE IMMEDIATELY DOWN-STREAM OF THE MAIN SHUT OFF VALVE. PLANS AND SPECIFICATIONS SHALL BE SUBMITTED FOR APPROVAL BY THE MUNICIPAL UTILITIES DEPARTMENT.
5. SYSTEM DESIGN SHALL BE BASED ON THE CALIFORNIA FIRE CODE, APPLICABLE PROVISION OF NATIONAL FIRE PROTECTION ASSOCIATION STANDARDS 13 AND 24, AND REQUIREMENTS OF THE STOCKTON FIRE DEPARTMENT. NOTE: CALIFORNIA WATER SERVICE COMPANY MAY HAVE OTHER REQUIREMENTS WHEN CONNECTION TO THEIR MAINS. THRUST BLOCK LOCATION AND THRUST BLOCK SIZE, HYDRANT SPACING, PIPE SIZES AND LENGTHS AND OTHER RELEVANT INFORMATION IS REQUIRED ON THE PLANS. PLANS MUST CLEARLY SHOW THAT BOLTS AND TIE RODS WILL BE COATED WITH A BITUMINOUS MATERIAL AND WRAPPED PRIOR TO COVERING.
6. THE STOCKTON FIRE DEPARTMENT REQUIRES CLASS 200 C-900 PIPE FOR PRESSURIZED UNDERGROUND MAINS. POST INDICATOR VALVES AND FIRE DEPARTMENT CONNECTIONS FOR SPRINKLER SYSTEMS SHALL BE AT LEAST 40 FEET FROM BUILDINGS. SECTIONAL VALVES SHALL BE UL LISTED FIRE PROTECTION VALVES. ALL VALVES CONTROLLING WATER SUPPLIES TO SPRINKLER SYSTEMS SHALL BE MONITORED BY A UL LISTED CENTRAL STATION. THIS REQUIRES THE CONTRACTOR TO PROVIDE PVC PIPE FOR LOW VOLTAGE CONNECTION OF THE VALVE'S TAMPER SWITCH TO THE FIRE ALARM PANEL NORMALLY LOCATED IN THE BUILDING. THIS REQUIREMENT IS MANDATORY, REGARDLESS IF THE BUILDING CONTAINS LESS THAN 100 SPRINKLER HEADS. TRACER WIRE IS REQUIRED FOR ALL UNDERGROUND MAINS FOR BOTH HYDRANT AND SPRINKLER SYSTEMS.

REV. NO.	REV. DATE	REV. BY
3	6/1/2000	HLE/RH
DIGITIZED	1/1/92	
DWG. BY	RC	SCALE
CK. BY		NONE

FIRE PROTECTION SYSTEM STANDARDS

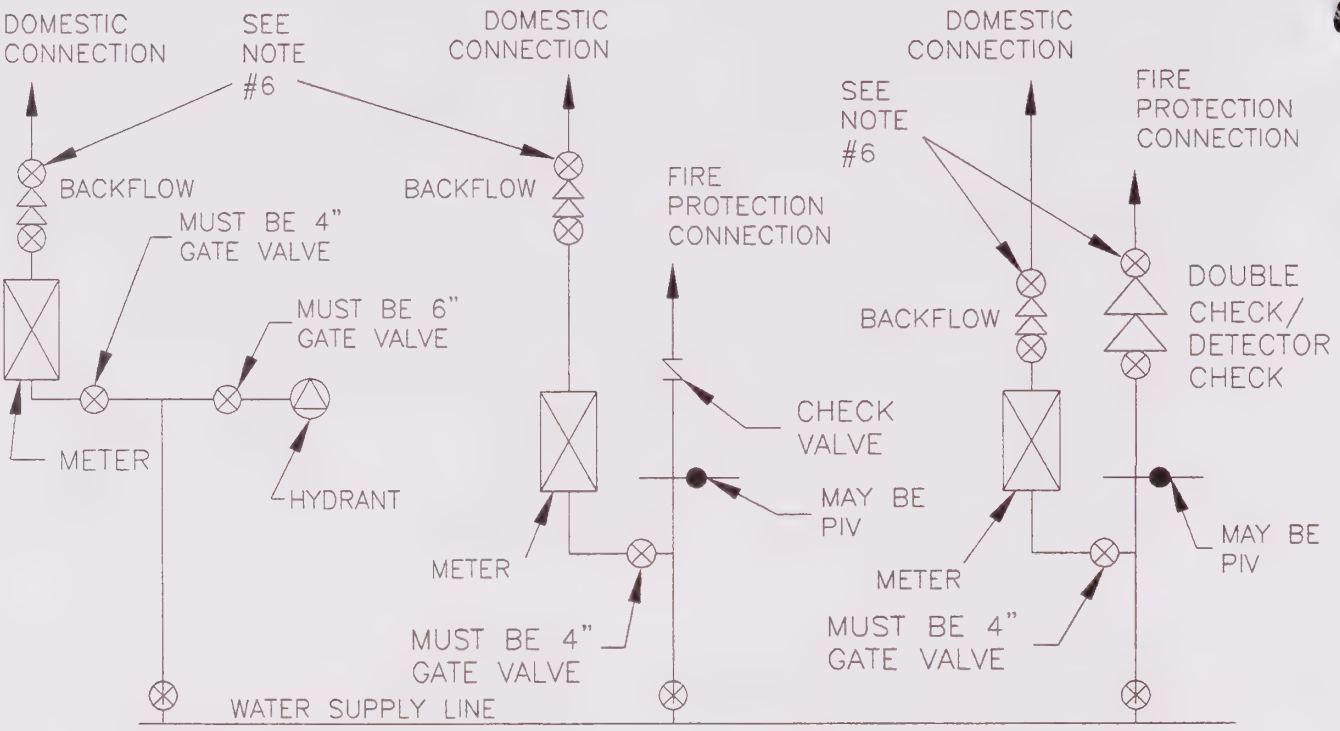
CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 01/09/02

SUPERCEDES DWG. DATED	DRAWING NO.
6/1/94	102

(CONT'D FROM DWG. 102)

STANDARDS FOR FIRE PROTECTION SYSTEMS

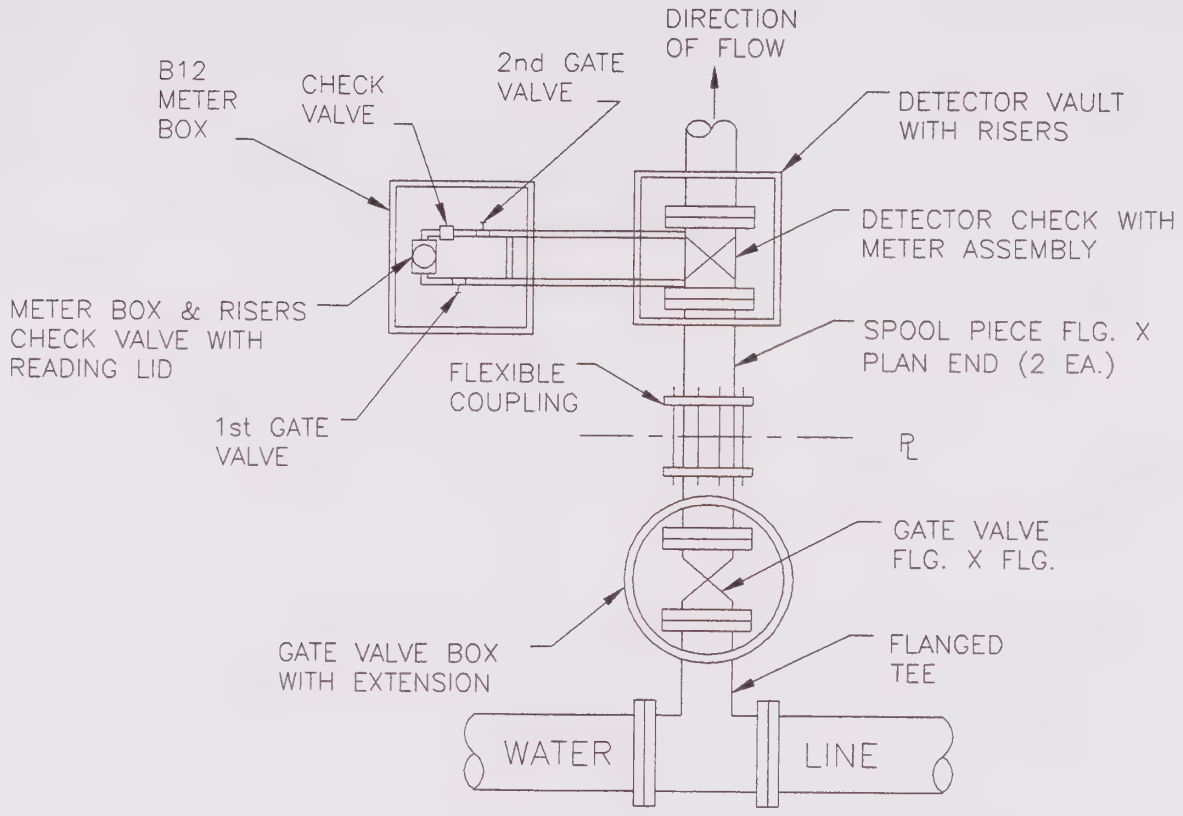


PIV = POST INDICATOR VALVE

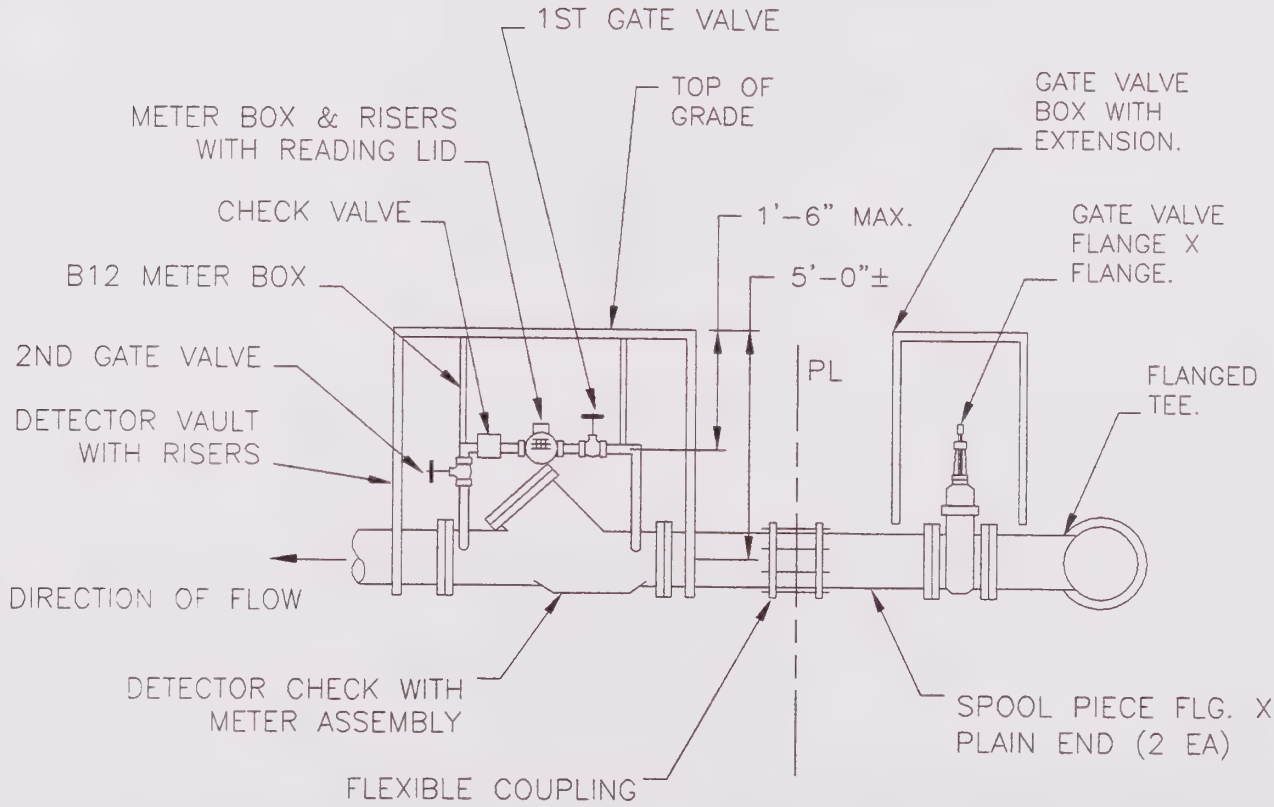
INSTALLATION AND INSPECTION REQUIREMENTS:

1. FIRE HYDRANTS, ON-STREET AND/OR ON SITE, SHALL BE INSTALLED IN ACCORDANCE WITH CITY OF STOCKTON STANDARD SPECIFICATIONS. INSPECTION APPROVAL BY FIRE DEPARTMENT IS REQUIRED PRIOR TO ANY BACKFILL.
2. A MATERIALS INSPECTION IS REQUIRED BEFORE ASSEMBLING UNDERGROUND FIRE PROTECTION SYSTEMS. STOCKTON FIRE DEPARTMENT PLAN APPROVAL IS REQUIRED PRIOR TO CONSTRUCTION.
3. A PRESSURE TEST AT 200 P.S.I. FOR 2 HOURS WITNESSED BY THE STOCKTON FIRE DEPARTMENT IS REQUIRED FOR ALL SYSTEMS. PLEASE NOTE THAT THE UNDERGROUND FIRE PROTECTION SYSTEM CAN ONLY BE FILLED USING A JUMPER EQUIPPED WITH A BACKFLOW PREVENTION DEVICE ACCORDING TO CITY OF STOCKTON STANDARDS. PIPE MAY BE CENTER LOADED FOR THIS INSPECTION, HOWEVER, ALL THRUST BLOCKS AND JOINTS MUST BE EXPOSED. PLEASE ALSO NOTE THAT COATING AND WRAPPING OF BOLTS AND TIE RODS, IF REQUIRED, MUST BE COMPLETED BEFORE CALLING FOR AN INSPECTION.
4. A SUCCESSFUL BACTERIAL TEST AND FLUSHING WITNESSED BY THE STOCKTON FIRE DEPARTMENT IS REQUIRED BEFORE CONNECTING TO THE PUBLIC MAIN IS PERMITTED.
5. SEPARATE SUBMITTALS TO THE STOCKTON FIRE DEPARTMENT ARE REQUIRED FOR ABOVE GROUND FIRE PROTECTION SYSTEMS.
6. VALVES ON BACKFLOW DEVICES ARE NOT TO BE USED TO SUBSTITUTE FOR VALVES SHOWN ON DIAGRAM. BACKFLOW DEVICES MUST REMAIN IN ORIGINAL CONFIGURATION AS PURCHASED FROM MANUFACTURER.

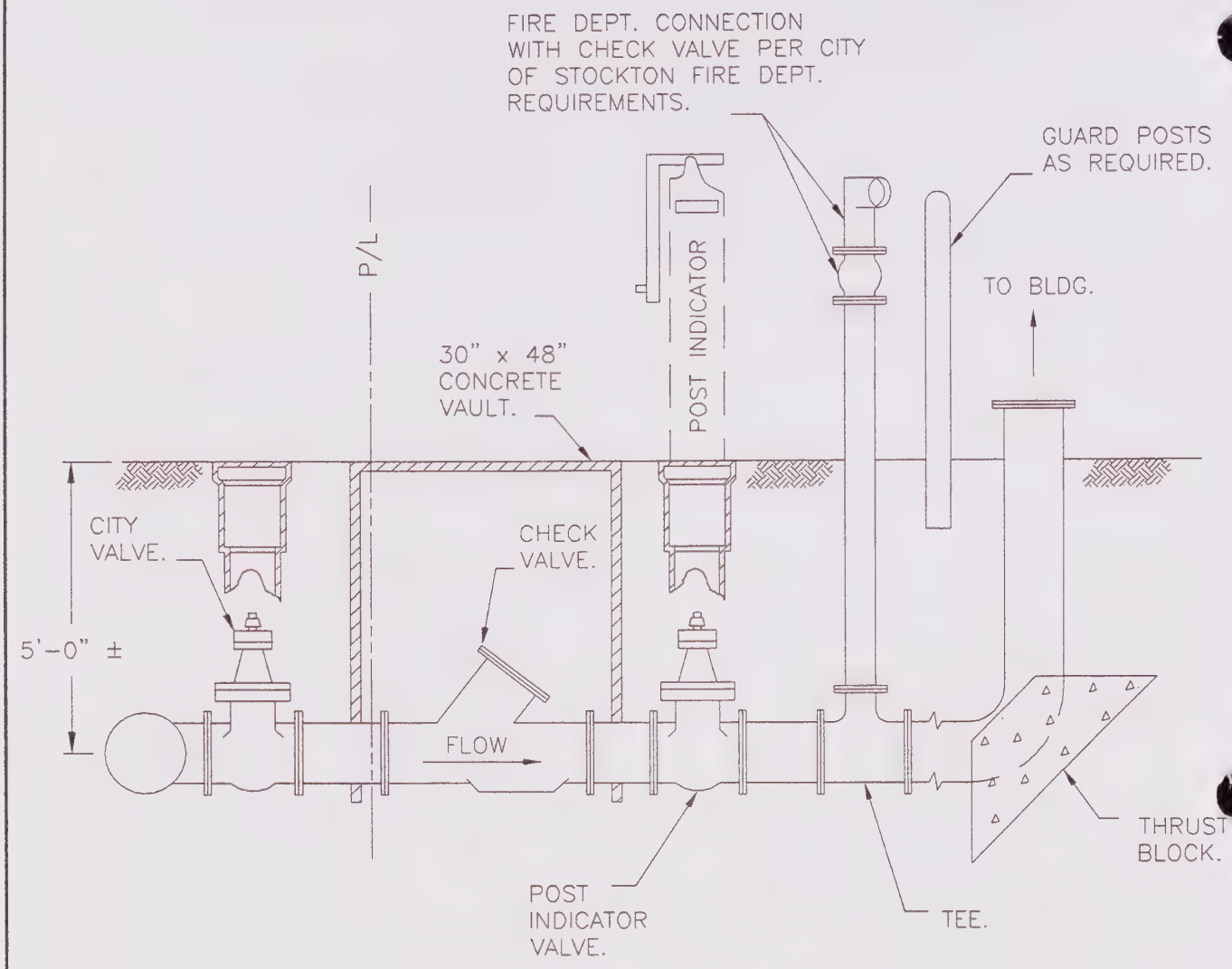
REV. NO.	REV. DATE	REV. BY	FIRE PROTECTION SYSTEM STANDARDS	REVISION APPROVED BY CITY ENGINEER
4	6/1/2003	HL/EA		
DIGITIZED	1/1/92			DATE:
DWG. BY RC	SCALE		CITY OF STOCKTON	SUPERCEDES DWG. DATED 01/09/02
CK. BY	NONE		DEPARTMENT OF PUBLIC WORKS	DRAWING NO. 102A



PLAN VIEW



REV. NO.	REV. DATE	REV. BY	DETECTOR CHECK METER ASSEMBLY	REVISION APPROVED BY CITY ENGINEER
4	6/1/2000	HLE/RH		Finbarr J. O'Regan
DIGITIZED	1/1/92			DATE: 01/09/02
DWG. BY RC	SCALE		CITY OF STOCKTON	SUPERCEDES DWG. DATED 6/1/94
CK. BY	NONE		DEPARTMENT OF PUBLIC WORKS	DRAWING NO. 103



REV. NO.	REV. DATE	REV. BY
2	6/1/2000	HLE/RH
DIGITIZED	7/1/91	

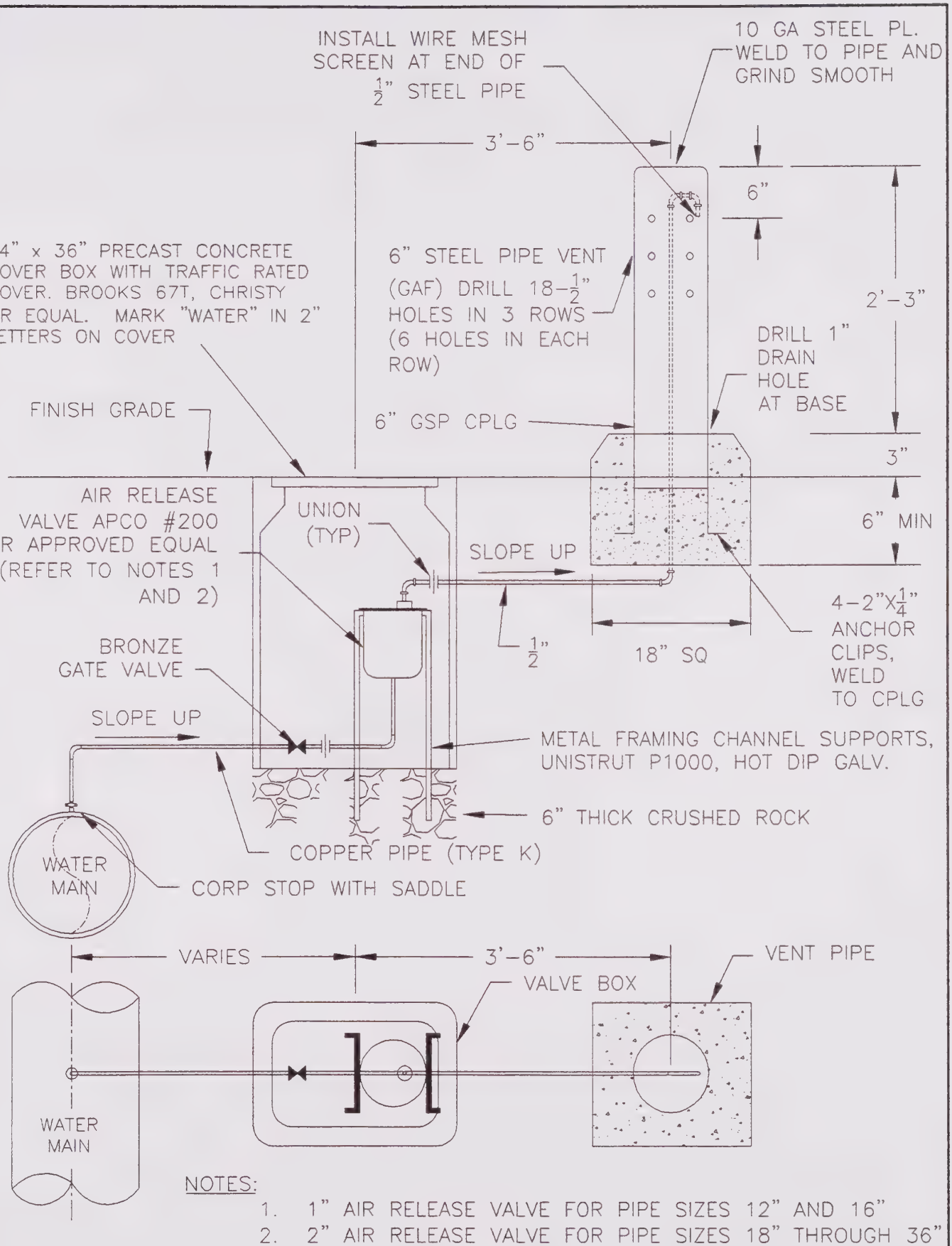
DWG. BY	RC	SCALE
CK. BY		NONE

TYPICAL FIRE SPRINKLER LINE WITH POST INDICATOR VALVE

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 01/09/02

SUPERCEDES DWG. DATED	DRAWING NO.
10/7/93	103A



NOTES:

1. 1" AIR RELEASE VALVE FOR PIPE SIZES 12" AND 16"
2. 2" AIR RELEASE VALVE FOR PIPE SIZES 18" THROUGH 36"

REV. NO.	REV. DATE	REV. BY

DIGITIZED 03/20/03

DWG. BY AST | SCALE

CK. BY | NONE

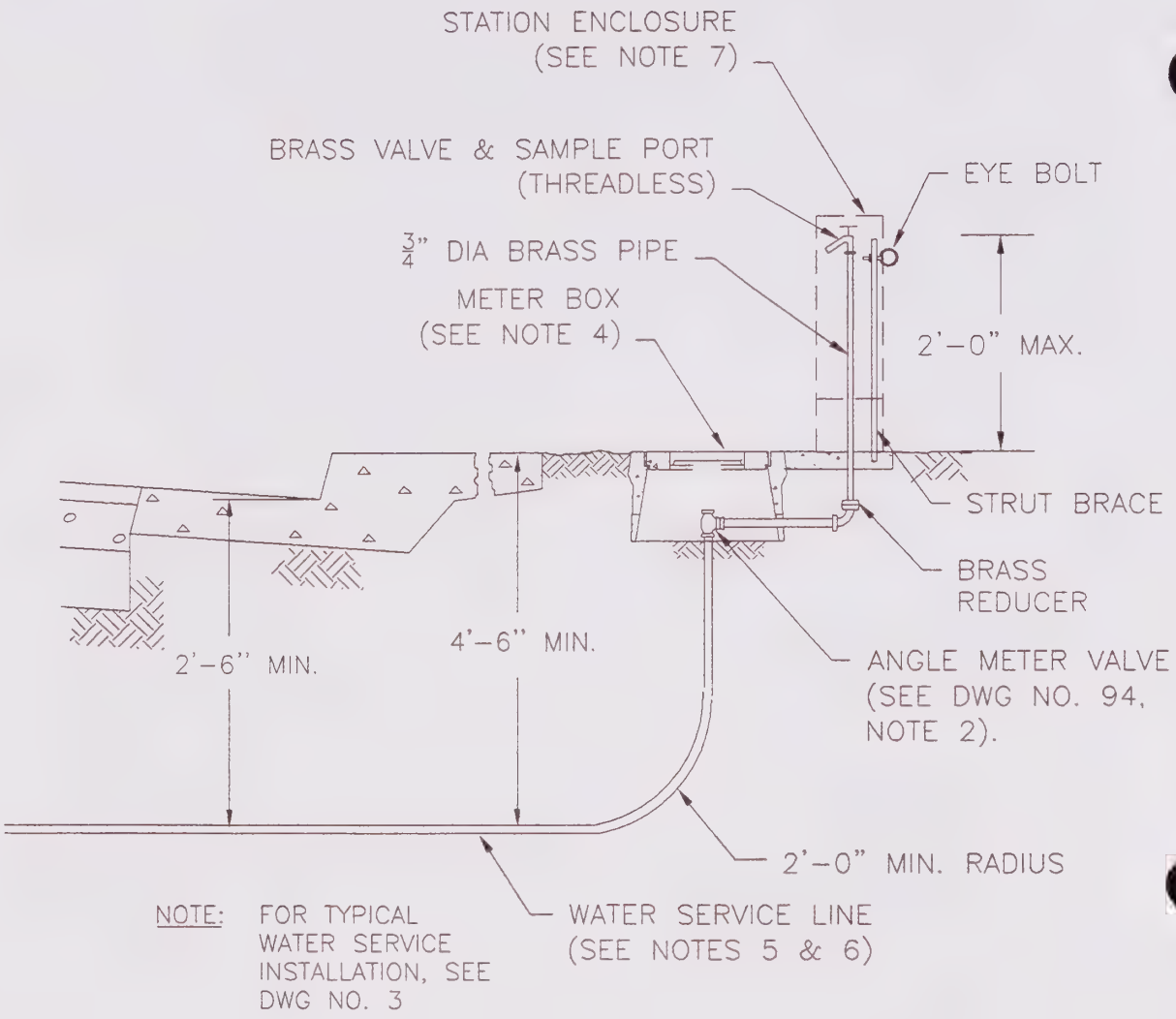
AIR RELEASE VALVE
WATER MAINS 12" – 36" DIAMETER

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 11/25/03

SUPERCEDES DWG. DATED

DRAWING NO. 104



NOTES:

1. SEE DWG NO. 94 AND 94A FOR FITTINGS.
2. SERVICE LINE SHALL BE A DEDICATED LINE FOR THE SAMPLING STATION UNLESS PRIOR APPROVAL OF MUNICIPAL UTILITIES DEPARTMENT.
3. SAMPLING STATION MAY BE PLACED ADJACENT TO PROPERTY OR EASEMENT LINE WITH PRIOR APPROVAL OF MUNICIPAL UTILITIES DEPARTMENT.
4. SEE DWG NO. 94, NOTES 4 & 5, FOR METER BOX & LID TYPE.
5. PLASTIC SERVICE PIPE TO BE CONTINUOUS WITH NO SPLICING ALLOWED.
6. 1" DIAMETER MINIMUM LINE FOR EACH STATION.
7. STATION ENCLOSURE SHALL BE PROVIDED BY CITY OF STOCKTON.

REV. NO.	REV. DATE	REV. BY	WATER SAMPLING STATION	REVISION APPROVED BY CITY ENGINEER
				Finbarr J. O'Regan
DIGITIZED	3/03			DATE: 11/25/03
DWG. BY BB	SCALE		CITY OF STOCKTON	SUPERCEDES DWG. DATED
CK. BY	NONE		DEPARTMENT OF PUBLIC WORKS	DRAWING NO. 105

ELECTRICAL IMPROVEMENT PLAN STANDARDS

ALL IMPROVEMENT PLANS INVOLVING THE INSTALLATION OR RELOCATION OF A STREET LIGHTING SYSTEM SHALL INCLUDE THE FOLLOWING DETAILED INFORMATION:

1. LOCATION OF ALL UNDERGROUND CONDUITS.
2. THE SIZE AND TYPE OF ALL CONDUITS.
3. THE NUMBER, SIZE AND TYPE OF ALL CONDUCTORS IN EACH CONDUIT.
4. THE SERVICE LOCATION OF THE P.G.&E. POWER SOURCE, TO INCLUDE THE POLE QUADRANT (SEE DWG. NO. 115).
5. THE LOCATION OF EACH STREET LIGHT FIXTURE.
6. THE LOCATION OF EACH PULLBOX.
7. THE VOLTAGE FOR EACH CIRCUIT AND THE WATTAGE OF EACH LUMINAIRE.
8. THE WIRE SIZE CALCULATIONS WHERE MULTIPLE CIRCUITS ARE USED.
9. A SUBDIVISION MASTER PLAN SHOWING ALL STREET LIGHTS SHALL BE REQUIRED FOR DEVELOPMENTS HAVING MORE THAN ONE FINAL MAP OR AS REQUIRED BY THE CITY ENGINEER.

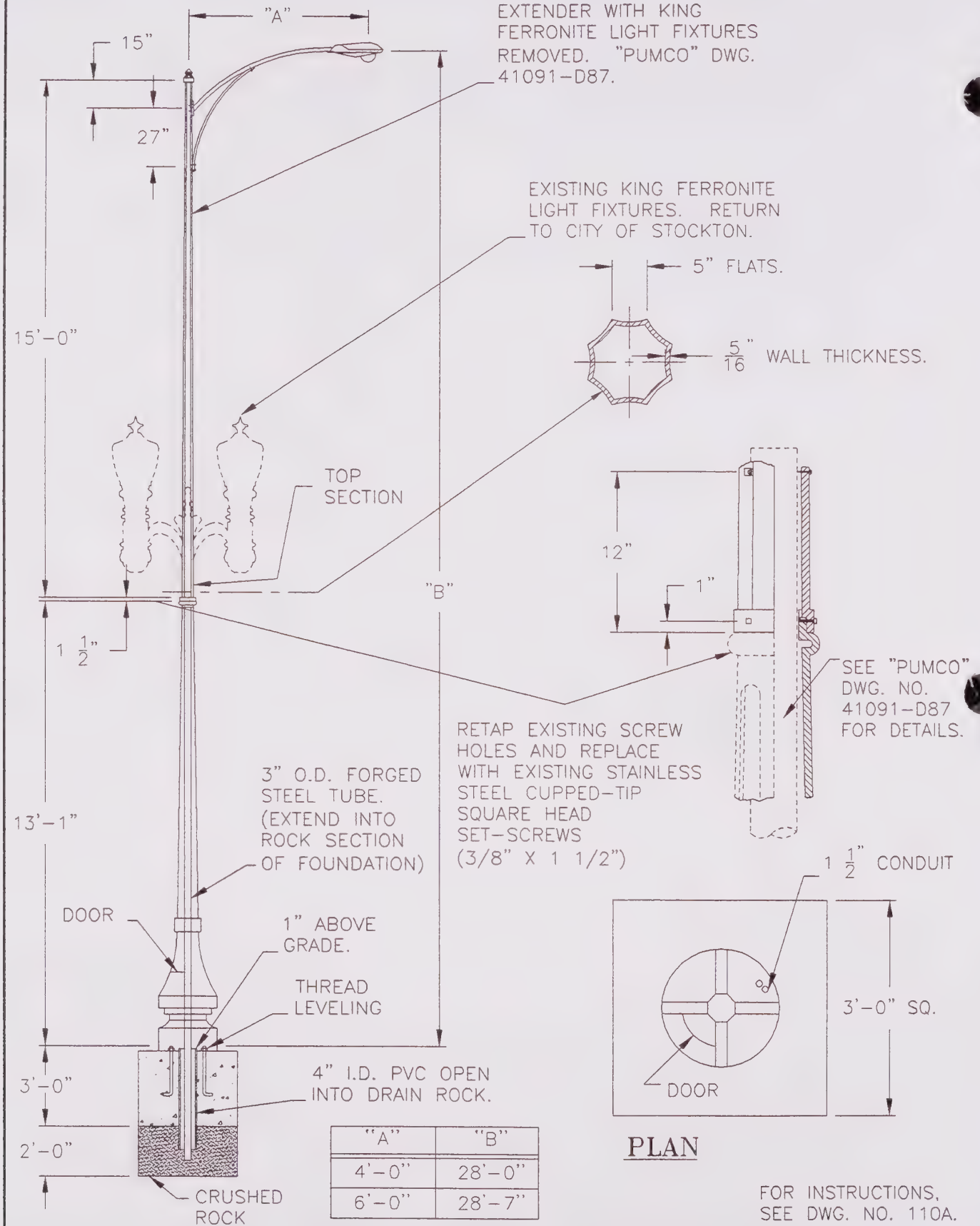
REV. NO.	REV. DATE	REV. BY
4	6/1/2000	HLE/RH
DIGITIZED	7/1/91	
DWG. BY	RC	SCALE
CK. BY		NONE

PLAN REQUIREMENTS FOR
STREET LIGHTING WORK

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 01/09/02

SUPERCEDES DWG. DATED	DRAWING NO.
10/7/93	109



"A"	"B"
4'-0"	28'-0"
6'-0"	28'-7"

PLAN

FOR INSTRUCTIONS, SEE DWG. NO. 110A.

REV. NO.	REV. DATE	REV. BY
3	6/1/2000	HLE/RH
DIGITIZED	1/1/90	

EXISTING CAST IRON KING FERRONITE ELECTROLIERS AND KING FERRONITE W/ MODIFIED HEADS AND EXTENDERS TO BE RELOCATED

DIGITIZED VERSION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 01/09/02

DWG. BY	RC	SCALE
CK. BY		NONE

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

SUPERCEDES DWG. DATED	DRAWING NO.
10/7/93	110

(CONT'D FROM DWG. 110)

GENERAL RELOCATION INSTRUCTIONS FOR DOWNTOWN KING FERRONITE ELECTROLIERS.

FOUNDATION:

CONCRETE – 5 SACK/1–1/2" ROCK
BOLT CIRCLE – 17–1/4" (VERIFY WITH UNIT BEING RELOCATED)
THREADED ANCHOR BOLTS – 24" X 4" X 1" GALV. WITH DOUBLE NUTS
CENTER HOLE – 6" DIA. X 3'–0" DEEP
WIRE – LEAD WIRE MAY NOT BE USED

STIFFARM:

EXTEND 3'–0" INTO NEW LUMINAIRE PVC, CENTERED, SAND PACKED, AND GROUTED, TYP.

CONDUIT:

1–1/2" RIGID MINIMUM. REPLACE AS REQUIRED. BOND ALL CONDUITS.

STANDARD:

REMOVE TOP SECTION BEFORE ATTEMPTING TO PULL STANDARD. STANDARD IS CAST IRON. PAST EXPERIENCE HAS SHOWN THAT A CRANE IS REQUIRED TO MOVE THE UNIT. CENTER STIFFENER IS EMBEDDED IN CRUSHED ROCK AND CAPPED WITH CONCRETE. CAP SHOULD BE BROKEN BEFORE ATTEMPTING TO PULL STANDARD.

BALLAST: AS REQUIRED TO MATCH EXISTING CIRCUIT.

EXTENDER: SEE EXTENDER DETAIL: "PUMCO" DWG. NO. 41091–D87.

HEAD: COBRA STYLE WITH PHOTO ELECTRIC CELL.

WIRE:

EXISTING SERIES CIRCUIT
#8 SOLID COPPER – 8000V
POLY INSULATION 120 MIL
PVC JACKET 47 MIL
SINGLE CONDUIT
PARALLEL CIRCUITS
MIN. #8 – 600V

REPAIR DOOR AND HARDWARE IF NECESSARY.
REPAIR RUST–OUTS, ETC.
SAND ALL FLAKING, RUST OR LOOSE PAINT OFF ENTIRE UNIT.

PAINT:

COBRA STYLE INSTALLATION: SHERWIN–WILLIAMS #F63–SXG–8692–8127 LOW LEAD "STOCKTON GREEN".
KING FERRONITE STYLE INSTALLATION: SHERWIN WILLIAMS #F63–SXG–8692–8127 LOW LEAD "STOCKTON GREEN" OR AMERICAN 179A "GROTTO GREEN".

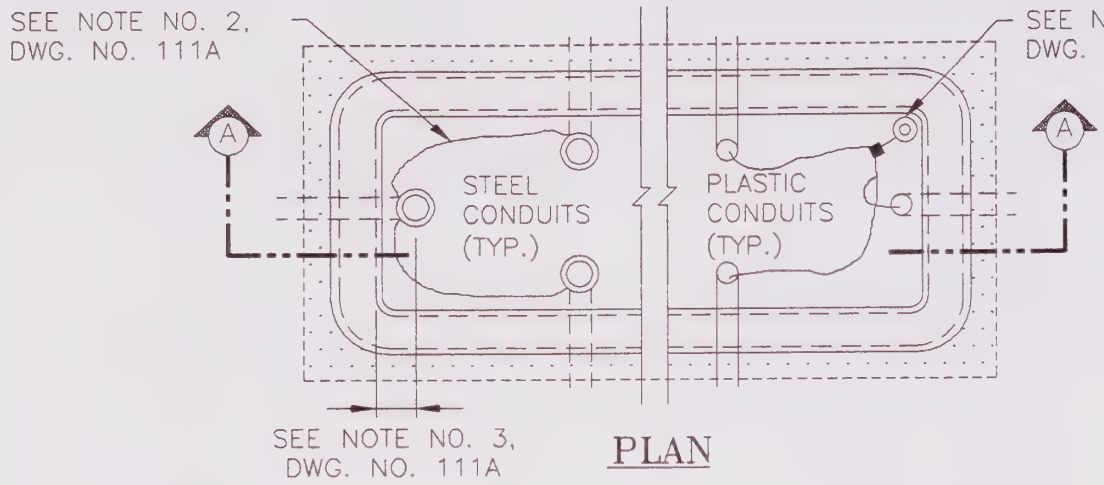
REV. NO.	REV. DATE	REV. BY
3	6/1/2000	HLE/RH
DIGITIZED	1/1/90	
DWG. BY	RC	SCALE
CK. BY		NONE

EXISTING CAST IRON KING FERRONITE ELECTROLIERS AND KING FERRONITE W/ MODIFIED HEADS AND EXTENDERS TO BE RELOCATED

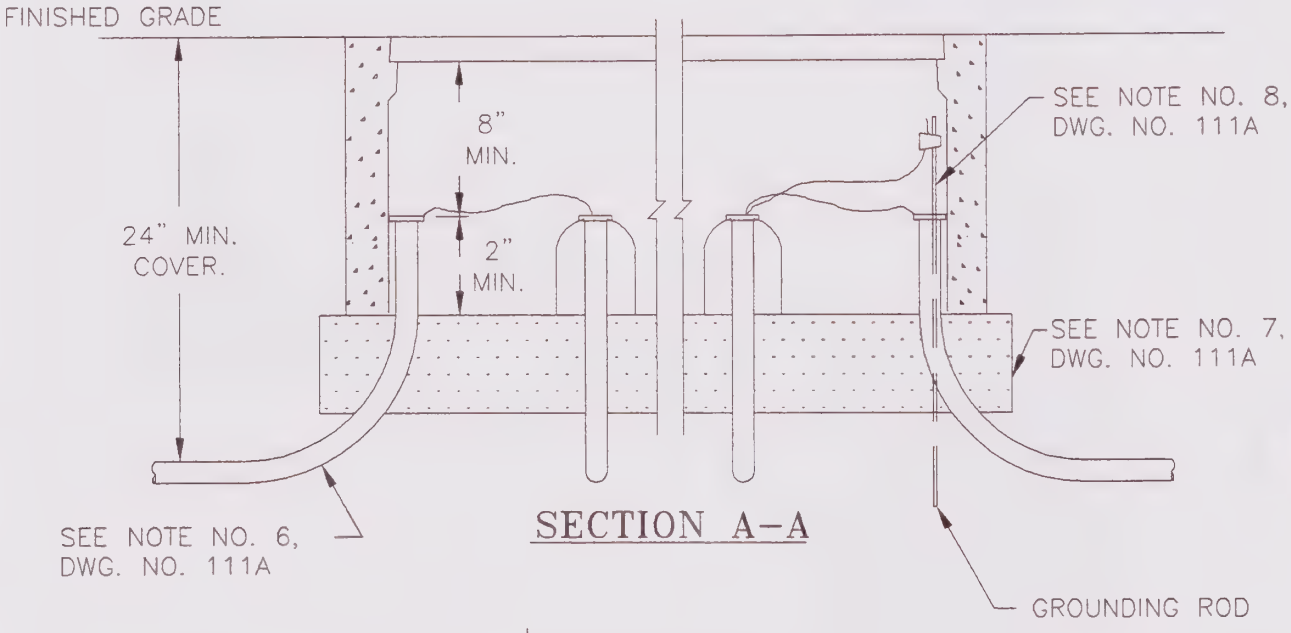
CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

DIGITIZED VERSION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 01/09/02

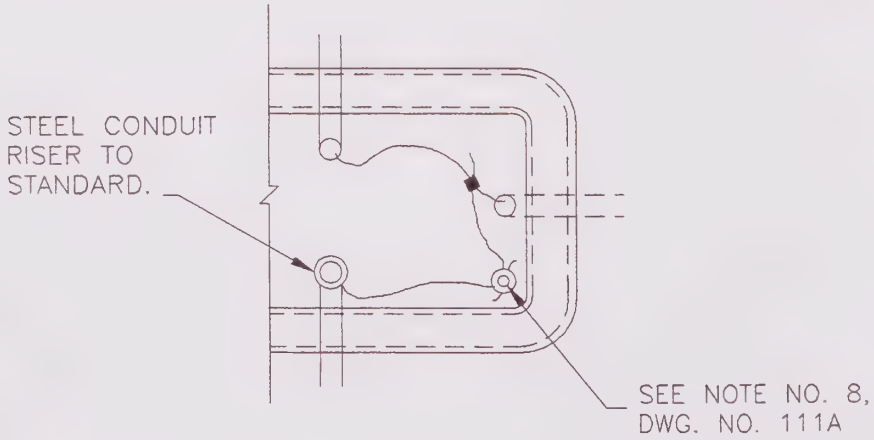
SUPERCEDES DWG. DATED	DRAWING NO.
10/7/93	110A



PLAN



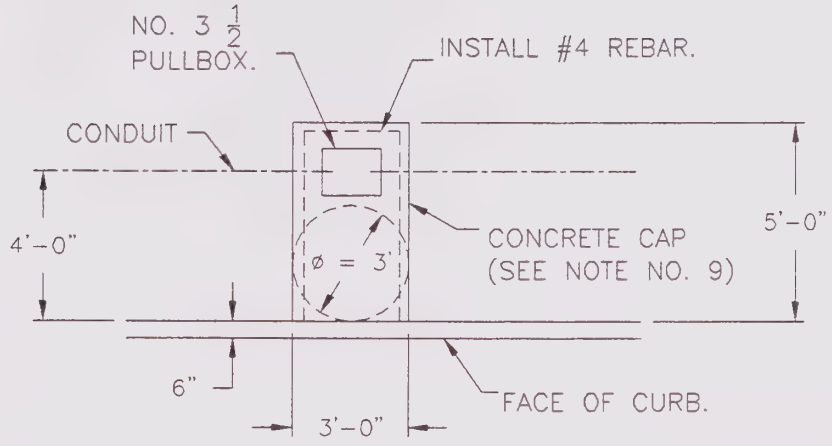
SECTION A–A



GROUNDING DETAIL

REV. NO.	REV. DATE	REV. BY	CONDUIT PULL BOX	REVISION APPROVED BY CITY ENGINEER
3	6/1/2000	HLE/RH		Finbar J. O'Regan
DIGITIZED	7/1/91			DATE: 01/09/02
DWG. BY RC	SCALE		CITY OF STOCKTON	SUPERCEDES DWG. DATED 10/7/93 / DRAWING NO. 111
CK. BY	NONE		DEPARTMENT OF PUBLIC WORKS	

(CONT'D FROM DWG. 111)

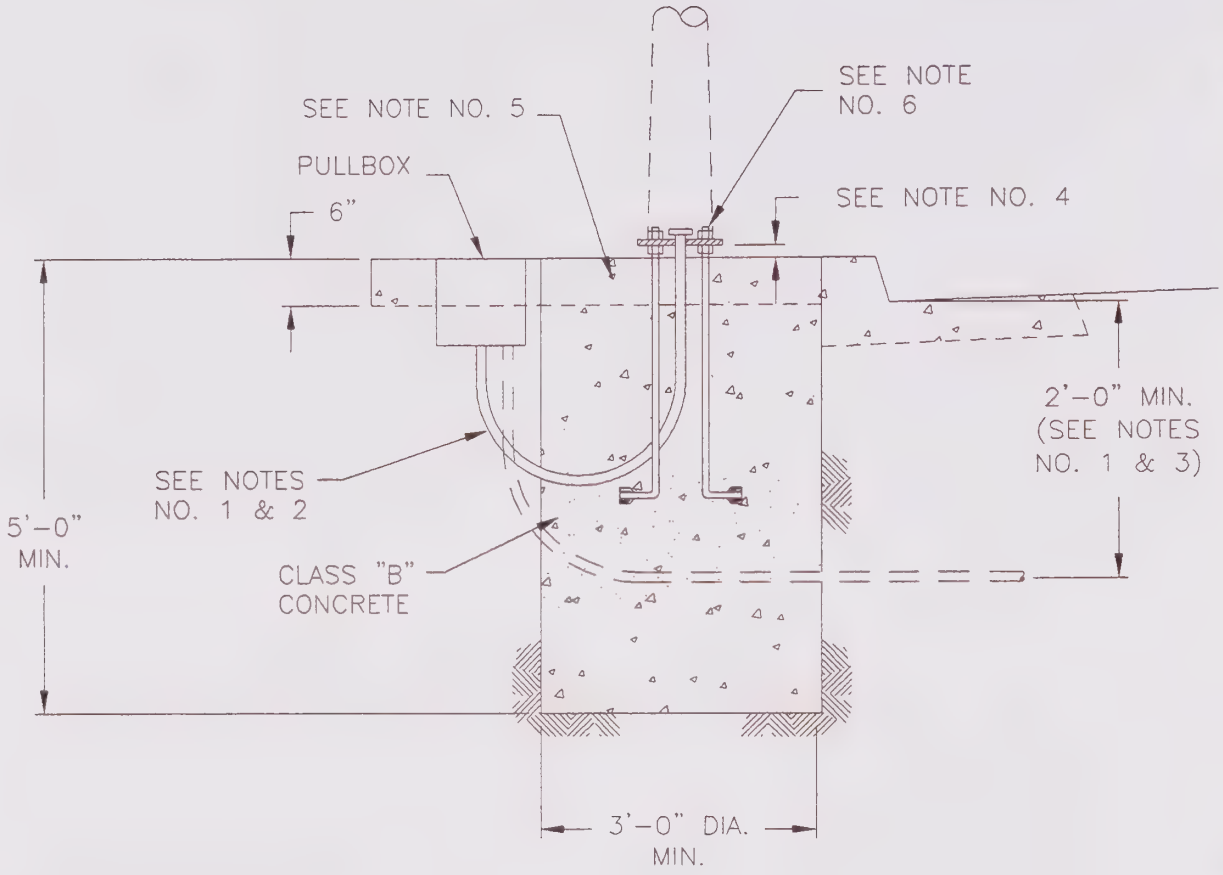


CONCRETE CAP FOR STREET LIGHTING

NOTES:

1. ALL NONMETALLIC CONDUIT SHALL HAVE A NO. 8 STRANDED (WITH GREEN INSULATION) COPPER BONDED/GROUNDING WIRE. (EXCEPT THE CONDUIT BETWEEN THE P.G.&E. SERVICE POINT/POLE AND THE FIRST STREET LIGHT PULL BOX). THESE BONDING/GROUNDING WIRES SHALL BE CONNECTED IN THE PULL BOX WITH CABLE CONNECTORS – BURNDY–SERVIT NO. KS–15 OR AN APPROVED EQUAL MEETING CALTRANS SPECIFICATIONS.
2. ENDS OF ALL STEEL CONDUITS ENTERING PULL BOX SHALL BE CAPPED WITH O–Z, TYPE "GB" BRONZE GROUNDING BUSHINGS AND CONNECTED TOGETHER WITH NO. 8 SOLID COPPER WIRE.
3. CONDUIT SHALL NOT EXTEND MORE THAN 3" INTO PULL BOX (TYPICAL ON ALL LOCATIONS).
4. MIDRUN PULL BOXES SHALL BE INSTALLED AT A DISTANCE OF NO MORE THAN 2'–0" FROM THE BACK OF CURB (IF NO SIDEWALK EXISTS) OR 2'–0" FROM THE BACK OF WALK (IF SIDEWALK EXISTS).
5. AFTER CONDUCTORS HAVE BEEN INSTALLED, THE ENDS OF CONDUITS TERMINATING IN PULL BOXES SHALL BE SEALED WITH AN APPROVED SEALING COMPOUND.
6. ON ALL TRAFFIC SIGNAL CONDUIT USE ONLY 90° SWEEP.
7. SET PULL BOX ON TOP OF 6" OF 3/4" MAX. CLEAN CRUSHED ROCK OR 1/2" MAX. PEA GRAVEL.
8. GROUND ROD AND CLAMP SHALL BE DRIVEN INTO NATIVE SOIL IN CORNER OF PULL BOX NO MORE THAN 3" FROM EITHER INSIDE WALL. GROUND ROD SHALL BE 8'–0" X 1/2" COPPERWELD. FOR GROUND ROD DELETION, PLAN APPROVAL BY CITY ENGINEER MUST BE GIVEN PRIOR TO INSTALLATION.
9. REFER TO C.O.S. DWG. NO. 112 FOR LIGHT POLE FOUNDATION AND DWG. NO. 114 FOR STREET LIGHT LOCATION.

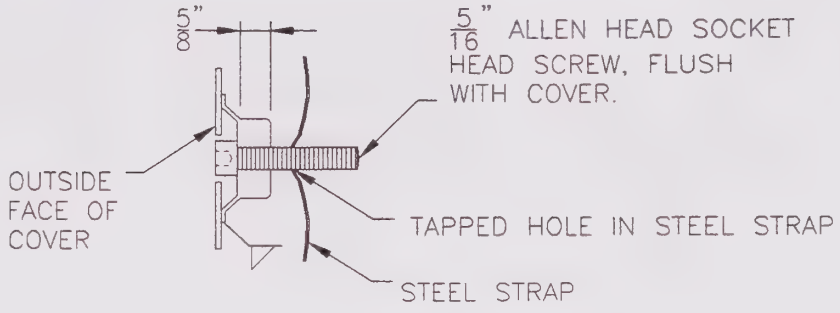
REV. NO.	REV. DATE	REV. BY	CONDUIT PULL BOX	REVISION APPROVED BY CITY ENGINEER
3	6/1/2000	HLE/RH		Finbarr J. O'Regan
DIGITIZED	7/1/91			DATE: 01/09/02
DWG. BY RC	SCALE		CITY OF STOCKTON	SUPERCEDES DWG. DATED 10/7/93
CK. BY	NONE		DEPARTMENT OF PUBLIC WORKS	DRAWING NO. 111A



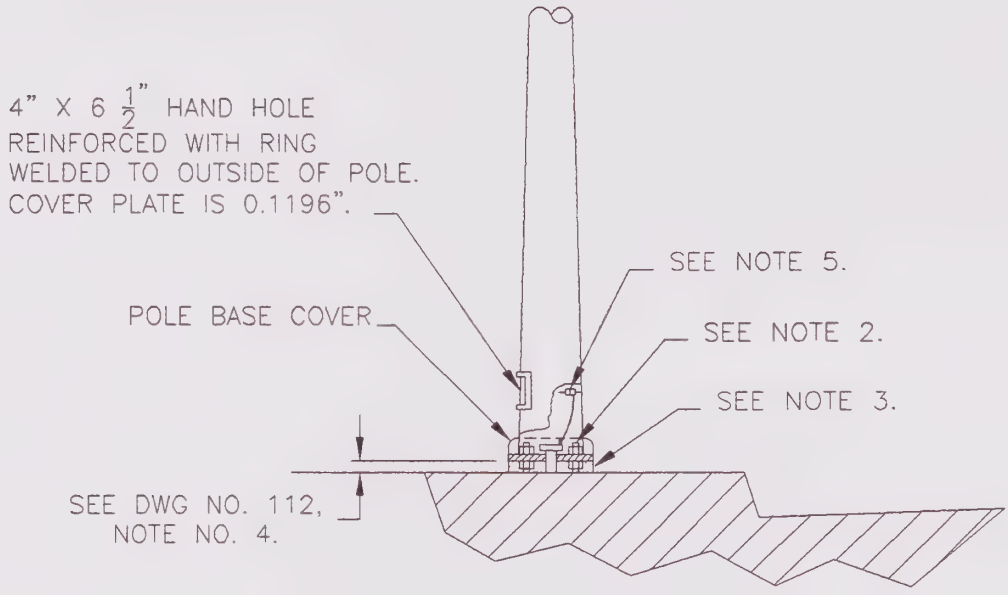
NOTES:

1. SCHEDULE 40 PVC SHALL BE USED FOR ALL STREET LIGHTING, EXCEPT ALL CONDUIT BENDS SHALL BE RIGID STEEL CONDUIT WITH 18" RADIUS SWEEPS.
2. INSTALL TO PULLBOX. 1-1/2" DIA. (MIN.) CONDUIT WITH 18" RADIUS BEND. CONDUIT SHALL EXTEND NOT MORE THAN 2" ABOVE THE TOP OF THE BASE PLATE. IF RIGID CONDUIT IS USED, PROVIDE GROUNDING BUSHING AT THE TOP END.
3. ANY CONDUIT IN STREET AREA SHALL BE MIN. OF 2'-0" BELOW THE FLOW LINE OF THE GUTTER.
4. 2"±1/4" TO BOTTOM OF BASE PLATE. WHERE POLES ARE INSTALLED IN CENTERLINE MEDIANS, THE BOTTOM OF STEEL BASE PLATE MUST BE INSTALLED 2-3/4" ABOVE MEDIAN CROWN IN ORDER TO PROVIDE FOR CROSS-SLOPE ON MEDIAN PAVING.
5. TOP 6" TO BE FORMED AND POURED AS A 3'-0" x 5'-0" CAP.
6. ANCHOR BOLTS SHALL BE GALVANIZED. A MIN. OF 1/2 THE TOTAL LENGTH FROM EACH THREADED END. BOLT SHALL BE PROVIDED WITH A LEVELING NUT, TWO WASHERS, AND A HOLD DOWN NUT. MAXIMUM LENGTH OF ANCHOR BOLT ABOVE THE TOP OF THE HOLD DOWN NUT SHALL BE 1".
7. ALTERNATE FOOTINGS SUBJECT TO THE APPROVAL OF THE CITY ENGINEER.

REV. NO.	REV. DATE	REV. BY	LIGHT POLE FOUNDATION	REVISION APPROVED BY CITY ENGINEER
3	1/1/2000	HLE/RH		Finbar J. O'Regan
DIGITIZED	7/1/91			DATE: 01/09/02
DWG. BY RC	SCALE		CITY OF STOCKTON	SUPERCEDES DWG. DATED 7/1/89 / DRAWING NO. 112
CK. BY	NONE		DEPARTMENT OF PUBLIC WORKS	



TAMPER RESISTANT HANDHOLE COVER



NOTES:

1. HAND HOLE SHALL BE LOCATED IN ANY QUADRANT THAT IS NOT OBSTRUCTED BY A FIXED OBJECT, PREFERABLY FRONT OR SIDE WITH RESPECT TO MAST ARM.
2. MAXIMUM LENGTH OF ANCHOR BOLT ABOVE THE TOP OF THE HOLD DOWN NUT SHALL BE 1".
3. GROUT AFTER ERECTING AND LEVELING POLE. WHEN SETTING POLES WITH FLAT STEEL BASES, PROVIDE A DRAINAGE HOLE (UNDER THE STEEL PLATE) TO THE CENTER OF THE POLE. FORM HOLE BEFORE CONCRETE SETS USING A PIECE OF WELDING ROD OR EQUAL.
4. A 1/2" DIA. TAPPED HOLE IN HAND HOLE COVER HOLDING FLANGE MAY BE SUBSTITUTED.
5. 1/2" X 1" FLATHEAD STEEL MACHINE SCREW WITH COURSE THREADS WELDED TO INSIDE OF POLE FOR GROUND. PROVIDE WITH 2 HEX HEAD NUTS AND 2 WASHERS. CONNECT TO GROUNDING BUSHING OF END OF CONDUIT WITH #8 SOLID COPPER WIRE (SEE NOTE 4.). #8 SOLID COPPER WIRE SHALL CONNECT POLE TO GROUND ROD IN PULL BOX. GROUND WIRE SHALL BE TERMINATED AT THE GROUND LUG AT THE BASE OF THE POLE.

REV. NO.	REV. DATE	REV. BY
1	6/1/2000	HLE/RH
DIGITIZED	9/22/98	

DWG. BY	RH	SCALE
CK. BY		NONE

LIGHT POLE INSTALLATION

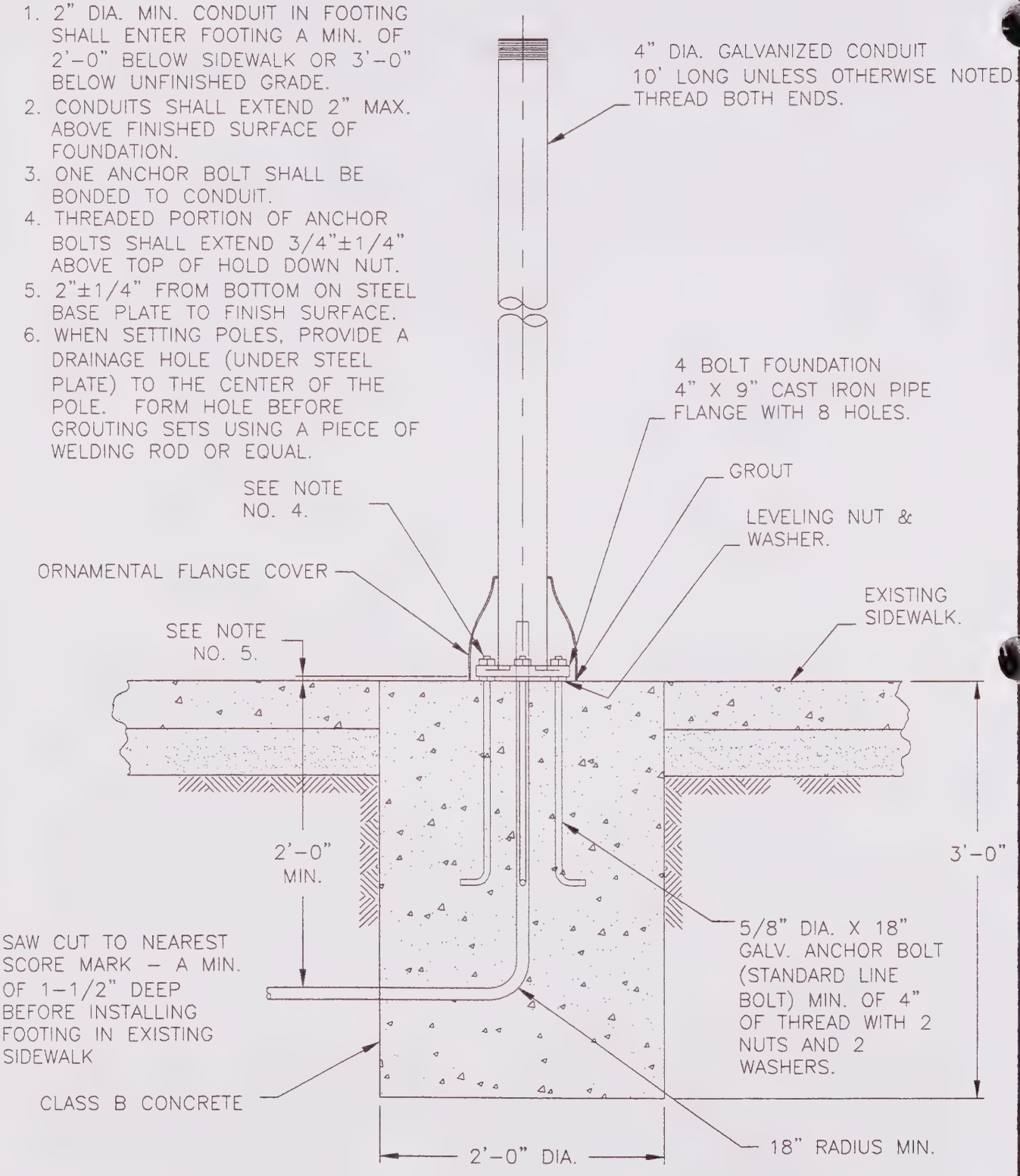
CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 01/09/02

SUPERCEDES DWG. DATED	DRAWING NO.
9/22/98	112A

NOTES:

1. 2" DIA. MIN. CONDUIT IN FOOTING SHALL ENTER FOOTING A MIN. OF 2'–0" BELOW SIDEWALK OR 3'–0" BELOW UNFINISHED GRADE.
2. CONDUITS SHALL EXTEND 2" MAX. ABOVE FINISHED SURFACE OF FOUNDATION.
3. ONE ANCHOR BOLT SHALL BE BONDED TO CONDUIT.
4. THREADED PORTION OF ANCHOR BOLTS SHALL EXTEND 3/4"±1/4" ABOVE TOP OF HOLD DOWN NUT.
5. 2"±1/4" FROM BOTTOM ON STEEL BASE PLATE TO FINISH SURFACE.
6. WHEN SETTING POLES, PROVIDE A DRAINAGE HOLE (UNDER STEEL PLATE) TO THE CENTER OF THE POLE. FORM HOLE BEFORE GROUTING SETS USING A PIECE OF WELDING ROD OR EQUAL.



REV. NO.	REV. DATE	REV. BY
4	6/1/2000	HLE/RH
DIGITIZED	7/1/91	
DWG. BY	RC	SCALE
CK. BY		NONE

TYPE 1–B SIGNAL AND CONTROLLER STANDARD

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

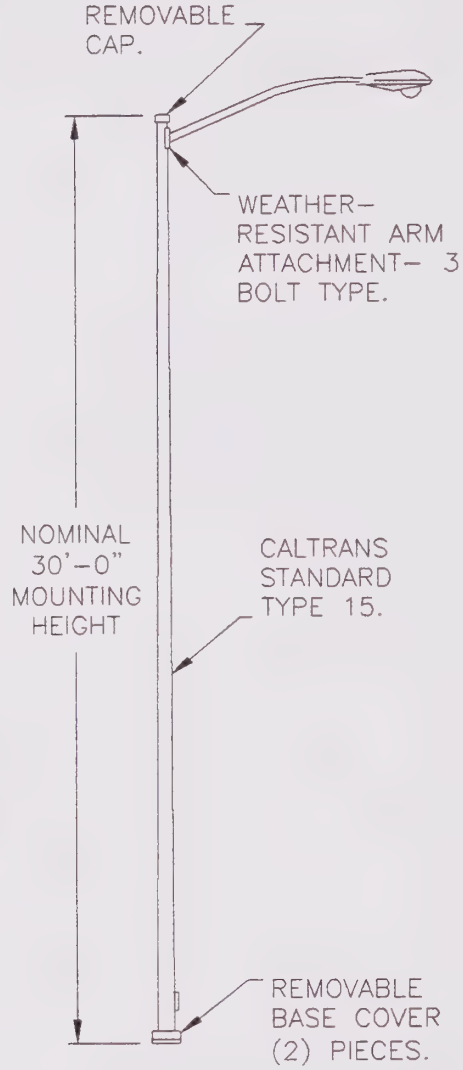
REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 01/09/02

SUPERCEDES DWG. DATED 10/7/93

DRAWING NO. 113



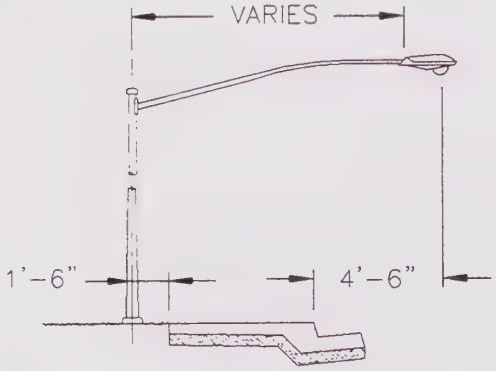
DOUBLE–MAST ARM

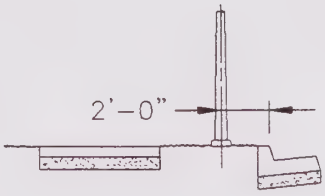


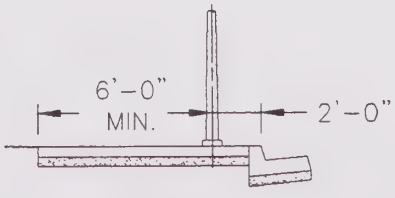
NOTES:

LUMINAIRES SHALL BE GENERAL ELECTRIC, HPS, MODEL #M2RR10S0A2AMS3 (100W), MODEL #M2RR15S0A2GMS3 (150W), AND MODEL #MSCL20S0A22FMC3 (200W). LUMINAIRES SHALL HAVE 2–BOLT INTERNAL SLIP FITTED MOUNT FOR ATTACHING TO MAST ARM. MINIMUM 28" FIXTURE LENGTH (SMALL CASE) FOR 100W AND 150W LUMINAIRES, 200W LUMINAIRE FIXTURE LENGTH NOT TO EXCEED 32" (LARGE CASE). LU100, LU150, AND LU200 HPS LAMPS AS NOTED ON THE PLANS SHALL COMPLY WITH FEDERAL GUIDELINES FOR TOXIC CHARACTERISTIC LEACHING PROCEDURE (TCLP) FOR NON–HAZARDOUS WASTE. PE CELLS PROVIDED WITH EACH LUMINAIRE SHALL BE SUNRISE TECHNOLOGIES SX124–1.5–ST. FEATURES INCLUDE INSTANT ON/DELAY OFF OPERATION FOR TESTING, ONE LUMEN LEVEL FOR TURN ON, FOUR LUMEN LEVEL FOR TURN OFF, AND AN OPERATING RANGE FROM 105 TO 285 VOLTS. "SHUNT CAPS" SHALL ALSO BE SUNRISE TECHNOLOGIES. BALLASTS SHALL BE MULTI–TAP (120/208/240/277V), REGULATOR TYPE. SINGLE POLE LIGHT INSTALLATIONS USE 120V TAP AND MULTIPLE POLE CIRCUITS USE 240V TAP UNLESS NOTED OTHERWISE ON THE PLANS OR SPECIFICATIONS.

1. STREET LIGHT STANDARDS SHALL BE PLACED AT ALL INTERSECTIONS, AND AT THE ENDS OF ALL CUL–DE–SACS AND COURTS 70'–0" OR MORE IN DEPTH. STANDARDS SHALL BE EVENLY SPACED, DEPENDING ON BLOCK LENGTHS, AT A DISTANCE OF NOT MORE THAN 250'–0" APART. ACTUAL STREET LIGHT LOCATIONS SHALL BE DETERMINED BY MAINTAINING A MIN. LUMINATION OF 0.1 FOOTCANDLE BETWEEN STREET LIGHT STANDARDS. STAGGERED SPACING SHALL BE USED WHENEVER POSSIBLE.
2. DIMENSIONS SHOWN ARE TO ℄ OF POLE.







REV. NO.	REV. DATE	REV. BY
4	6/1/2003	HL/EA
DIGITIZED	7/1/91	
DWG. BY	RC	SCALE
CK. BY		NONE

STREET LIGHTS
TYPE AND LOCATION

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 11/25/03

SUPERCEDES DWG. DATED	DRAWING NO.
01/09/02	114

(CONT'D FROM DWG. 114)

2. WIRING SHALL BE UNDERGROUND IN 1–1/2" UL APPROVED SCHEDULE 40 PVC CONDUIT (SPECIAL CONDITION MAY REQUIRE VARIATION OF CONDUIT SIZE AS APPROVED BY THE CITY ENGINEER) AND SHALL BE INSTALLED AS DIRECTED BY THE CITY OF STOCKTON. ALL CONDUCTORS SHALL BE COPPER. ALL GROUNDING CONDUCTORS SHALL BE BARE OR HAVE A GREEN INSULATION. ALL GROUNDED CONDUCTORS SHALL HAVE A WHITE OR NATURAL GREY INSULATION. PHASE TAPPING AND/OR PAINTING ARE NOT ALLOWED. (ALL COLORING MUST BE PERMANENT ALONG THE ENTIRED LENGTH OF THE CONDUCTOR.)
3. OVERHEAD SERVICE TO A STREET LIGHT IS NOT ALLOWED. REFER TO C.O.S. STANDARD DWG. NO. 115 FOR UNDERGROUND SERVICE REQUIREMENTS.
4. CONDUIT SYSTEM SHALL BE COMPLETE FROM THE STREET LIGHT TO THE P.G.&E. SOURCE.
5. SEE C.O.S. STANDARD DWGS. NO. 111, 112, AND 115 FOR ADDITIONAL DETAILS.
6. ALL MATERIALS AND INSTALLATION SHALL BE IN ACCORDANCE WITH SECTIONS 86–1, 86–2, AND 86–6 STATE OF CALIFORNIA STANDARD SPECIFICATIONS.
7. WATERPROOF FUSE HOLDERS AND FUSES (BAF15, BLF15) SHALL BE INSTALLED IN THE BASE OF THE POLE ADJACENT TO THE HAND HOLE IN EACH POLE. FUSE HOLDERS FOR THE 120 VOLT SERVICE SHALL BE "BUSS HEX" TYPE OR EQUAL. FUSE HOLDERS FOR 208/240 VOLT SERVICE SHALL BE "BUSS HEX TYPE" OR EQUAL. FUSE HOLDERS SHALL HAVE WIRE LUGS THAT ARE APPROPRIATE FOR THE WIRE SIZE. TYPE "AA" FOR WIRES UP TO #8 AND TYPE "AB" FOR #6 AND #4 WIRES. FUSE HOLDERS SHALL BE WATERPROOFED BY USING AN INSULATING BOOT (BUSSMAN P/N 1A0512) OR EQUAL. EACH LUMINAIRE ON A DOUBLE MAST ARM POLE SHALL HAVE A SEPARATE FUSE AND FUSE HOLDER.
8. WHEN SERVICING A SINGLE LUMINAIRE, A MINIMUM OF NO. 12 COPPER WIRE SHALL BE USED FROM THE PULLBOX TO THE FUSE HOLDER(S), AND FROM THE FUSE HOLDER(S) TO THE HEAD. WHERE MULTIPLE LUMINAIRES ARE BEING SERVED, A MINIMUM OF NO. 10 COPPER WIRE SHALL BE USED FROM THE PULLBOX TO THE FUSE HOLDER(S), AND A MINIMUM OF NO. 12 COPPER WIRE FROM THE FUSE HOLDER(S) TO EACH HEAD.
9. WIRE IN UNDERGROUND CONDUIT SHALL NOT BE SMALLER THAN NO. 10 COPPER SERVING A SINGLE LUMINAIRE WITHIN 150'–0" OF THE SERVICE POINT; NO. 8 COPPER OR LARGER SERVING 2 OR MORE LUMINAIRES.
10. THE OWNER OR CONTRACTOR OF ANY LIGHTING PROJECT IS REQ'D TO PAY P.G.&E. CO. THE CONNECTION FEE BEFORE ACCEPTANCE BY THE CITY.
11. DOUBLE–MAST ARM STREET LIGHT STANDARDS SHALL BE INSTALLED IN ALL MEDIAN STRIPS AND OTHER AREAS DESIGNATED BY THE CITY ENGINEER. ALL SINGLE–ARM LIGHTING SPECIFICATIONS SHALL ALSO APPLY TO THE DOUBLE ARM STANDARDS. EACH LUMINAIRE SHALL BE WIRED SEPARATELY.
12. ALL BONDING/GROUNDING WIRE SHALL BE INSTALLED AS SHOWN ON "CONDUIT PULLBOX" STANDARD DWG. NO. 111.
13. ALL CONDUCTOR SPLICES SHALL BE MADE WEATHERPROOF.
14. WHEN STREET LIGHT POLES ARE PAINTED, WITH THE APPROVAL OF THE CITY ENGINEER, THE LUMINAIRES SHALL BE PAINTED THE SAME COLOR.
15. PHOTOCELL UNIT SHALL BE INSTALLED WITH PHOTOCELL FACING NORTH.

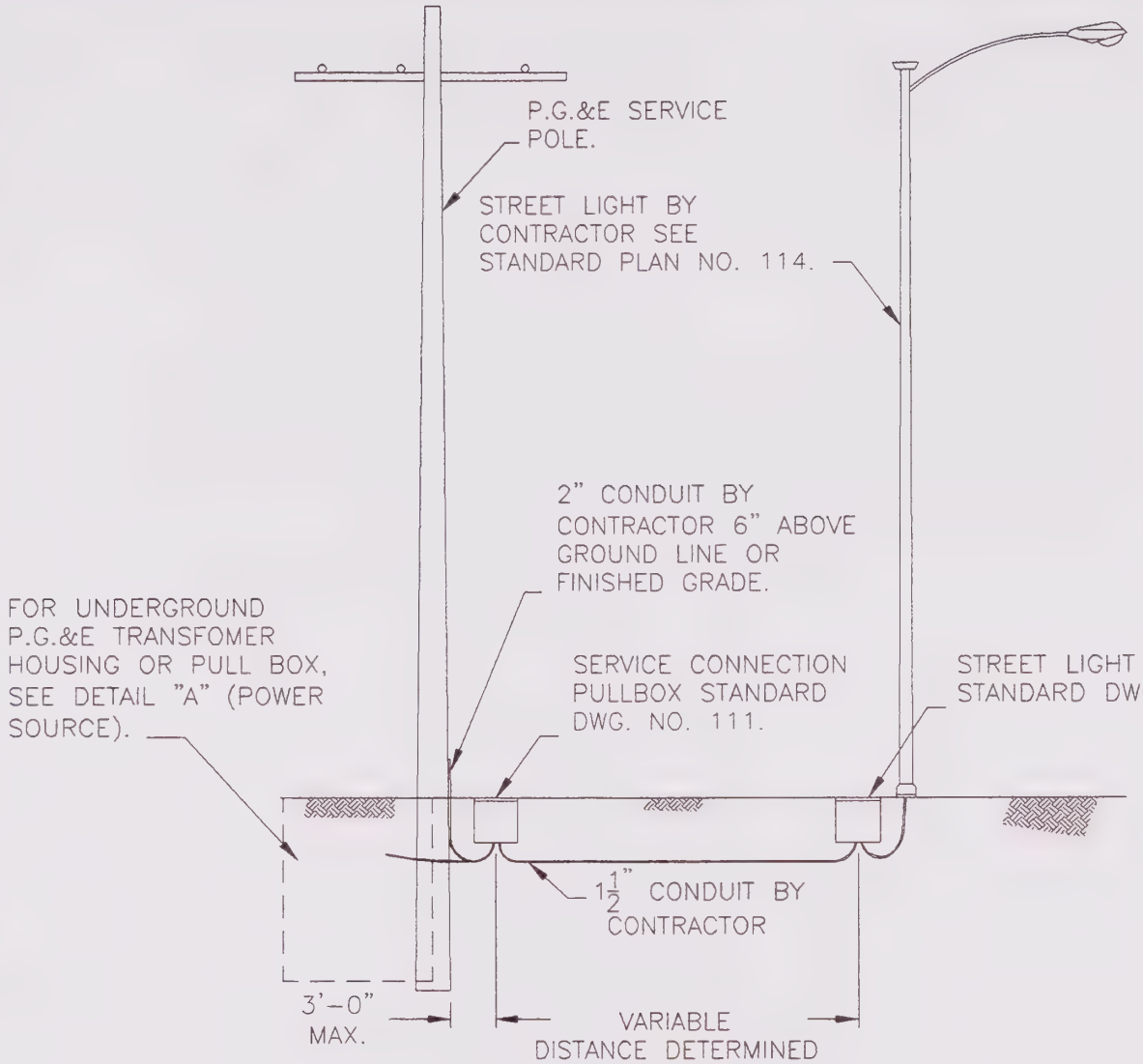
REV. NO.	REV. DATE	REV. BY
3	6/1/2000	HLE/RH
DIGITIZED	7/1/91	
DWG. BY	RC	SCALE
CK. BY		NONE

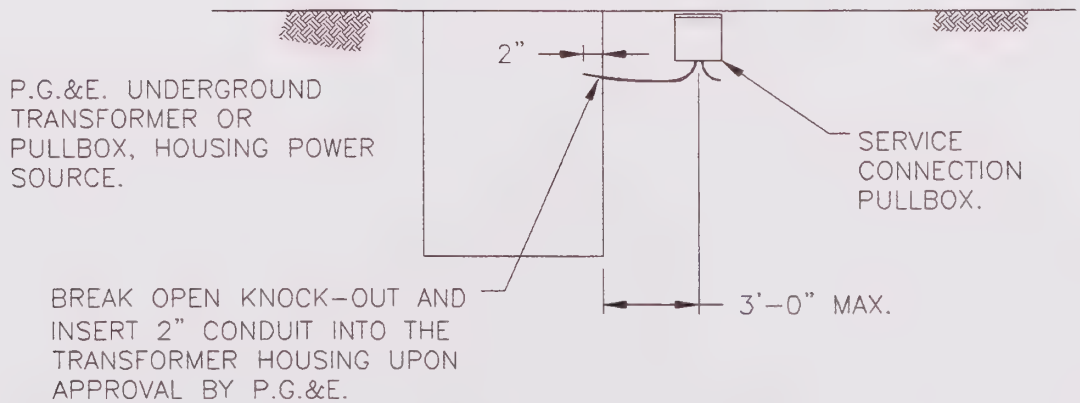
STREET LIGHTS
TYPE AND LOCATION

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 01/09/02

SUPERCEDES DWG. DATED	DRAWING NO.
10/7/93	114A





DETAIL "A"

FOR NOTES, SEE DWG. NO. 115A.

REV. NO.	REV. DATE	REV. BY	STREET LIGHT AND TRAFFIC SIGNAL SERVICE CONNECTION	REVISION APPROVED BY CITY ENGINEER
3	6/1/2000	HLE/RH		Finbar J. O'Regan
DIGITIZED	1/1/92			DATE: 01/09/02
DWG. BY	RC	SCALE	CITY OF STOCKTON DEPARTMENT OF PUBLIC WORKS	SUPERCEDES DWG. DATED 10/7/93
CK. BY		NONE		DRAWING NO. 115

(CONT'D FROM DWG. 115)

NOTES:

1. CONTRACTOR TO FURNISH AND INSTALL BOTH PULL BOXES SHOWN. SEE STANDARD DRAWING NO. 111.
2. CONTRACTOR TO FURNISH AND INSTALL CONDUCTORS IN CONDUIT BETWEEN THE TWO PULL BOXES SHOWN. CONTRACTOR TO LEAVE 3'–0" MIN. SLACK WIRE IN PULL BOX AT BASE OF P.G.&E. POLE.
3. P.G.&E. WILL PROVIDE CONDUCTORS DOWN SERVICE POLE TO PULL BOX AT BASE OF SERVICE POLE AND MAKE CONNECTIONS.

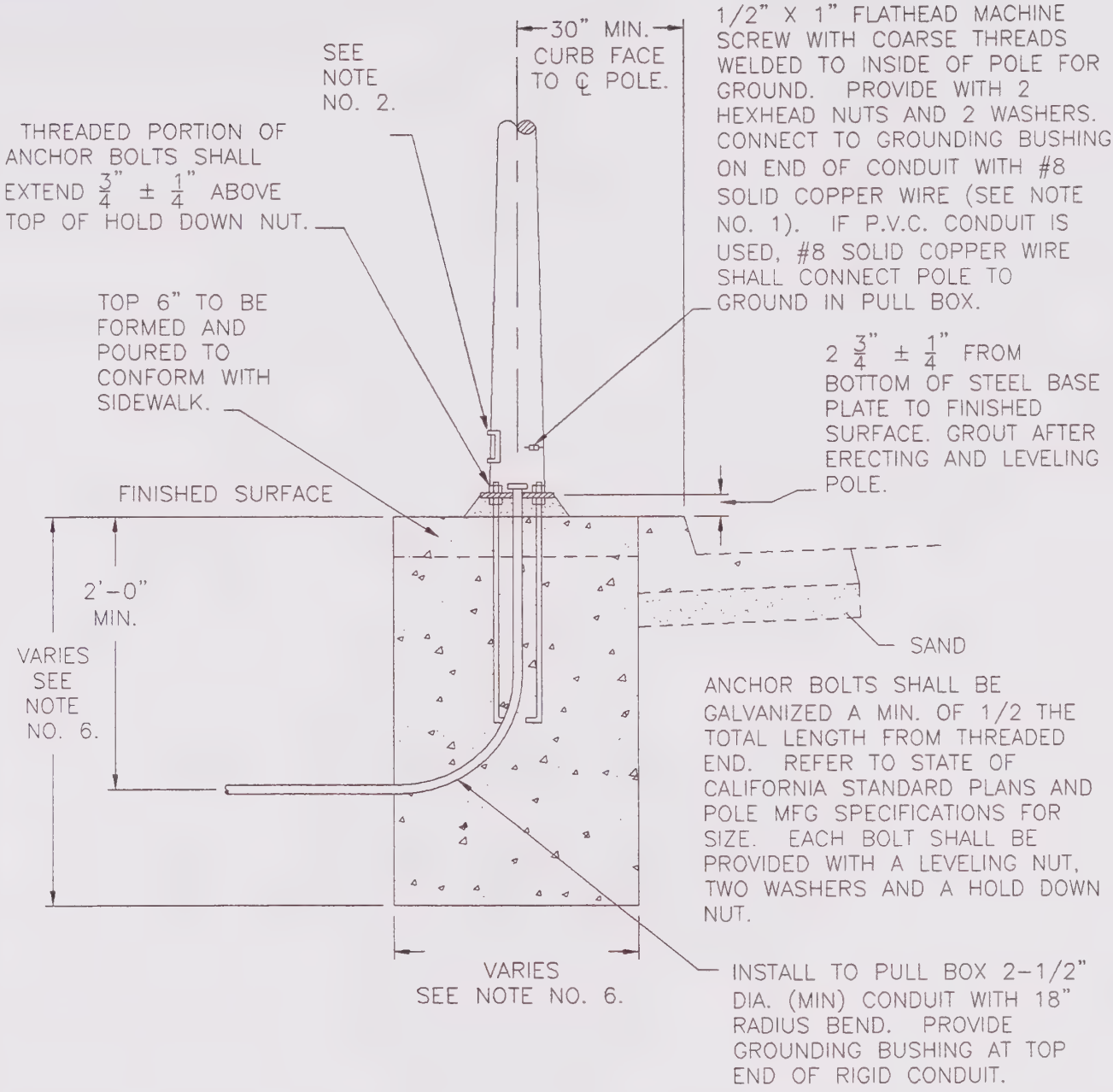
REV. NO.	REV. DATE	REV. BY
3	6/1/2000	HLE/RH
DIGITIZED	1/1/92	
DWG. BY RC	SCALE	
CK. BY	NONE	

STREET LIGHT AND TRAFFIC SIGNAL SERVICE CONNECTION

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbarr J. O'Regan
DATE: 01/09/02

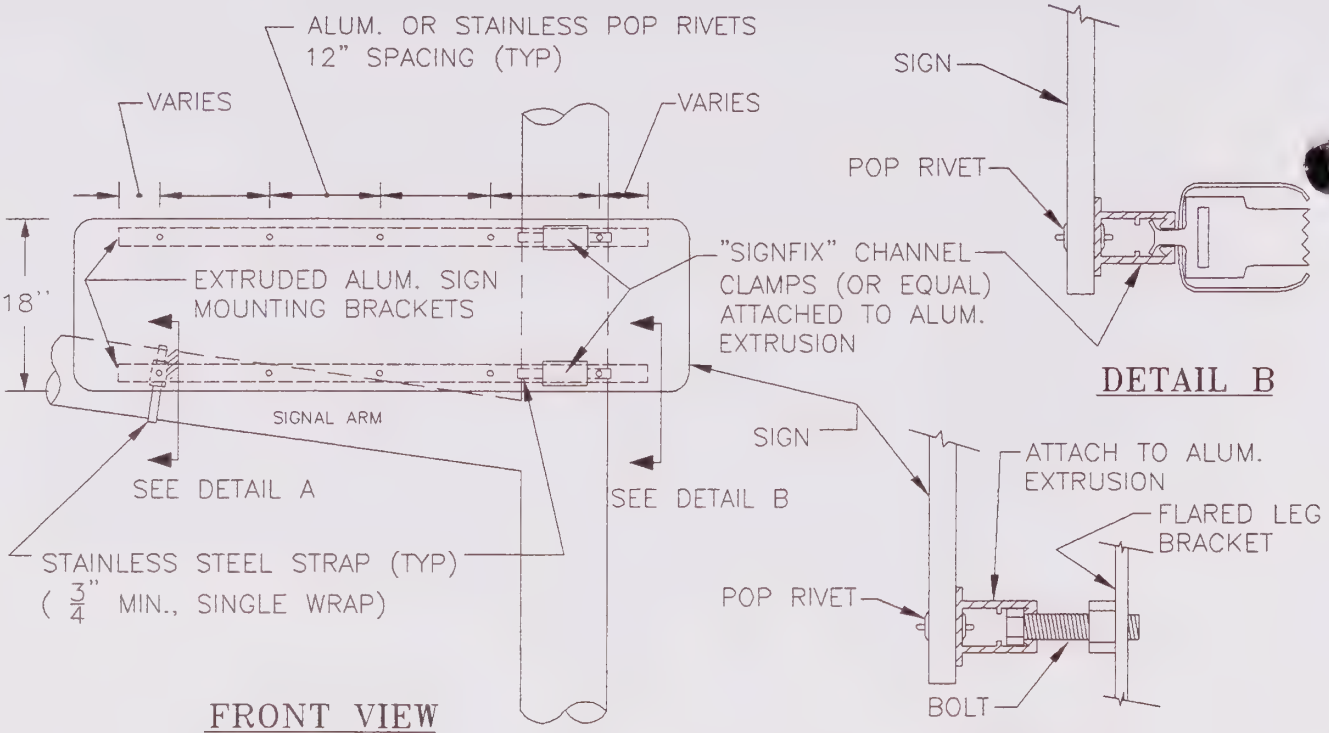
SUPERCEDES DWG. DATED	DRAWING NO.
10/7/93	115A



NOTES:

1. A 1/2" DIA. TAPPED HOLE IN HAND HOLE COVER HOLDING FLANGE MAY BE SUBSTITUTED.
2. SEE CALTRANS STANDARD PLANS FOR DETAILS FOR HANDHOLE AND COVER.
3. WHEN SETTING POLES, PROVIDE A DRAINAGE HOLE (UNDER STEEL PLATE) TO THE CENTER OF THE POLE. FORM HOLE BEFORE GROUTING SETS USING A PIECE OF WELDING ROD OR EQUAL.
4. HAND HOLE TO BE LOCATED IN SAME QUADRANT AS MAST ARM.
5. CONDUIT TO BE INSTALLED AS NOTED ON TRAFFIC SIGNAL DESIGN PLANS OR AS APPROVED BY THE ENGINEER.
6. FOUNDATION REQUIREMENTS AS PER STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION STANDARD PLANS AND SPECIFICATIONS.
7. SEE DRAWING NO. 113 FOR TYPE 1-B FOUNDATION.

REV. NO.	REV. DATE	REV. BY	TRAFFIC SIGNAL FOUNDATION	REVISION APPROVED BY CITY ENGINEER
2	6/1/2000	HLE/RH		Finbarr J. O'Regan
DIGITIZED	1/1/92			DATE: 01/09/02
DWG. BY RC	SCALE		CITY OF STOCKTON	SUPERCEDES DWG. DATED
CK. BY	NONE		DEPARTMENT OF PUBLIC WORKS	10/7/93
				DRAWING NO. 116







SPECIAL DOUBLE–NAME SIGN

(SEE NOTE NO. 3, DWG. NO. 117A)

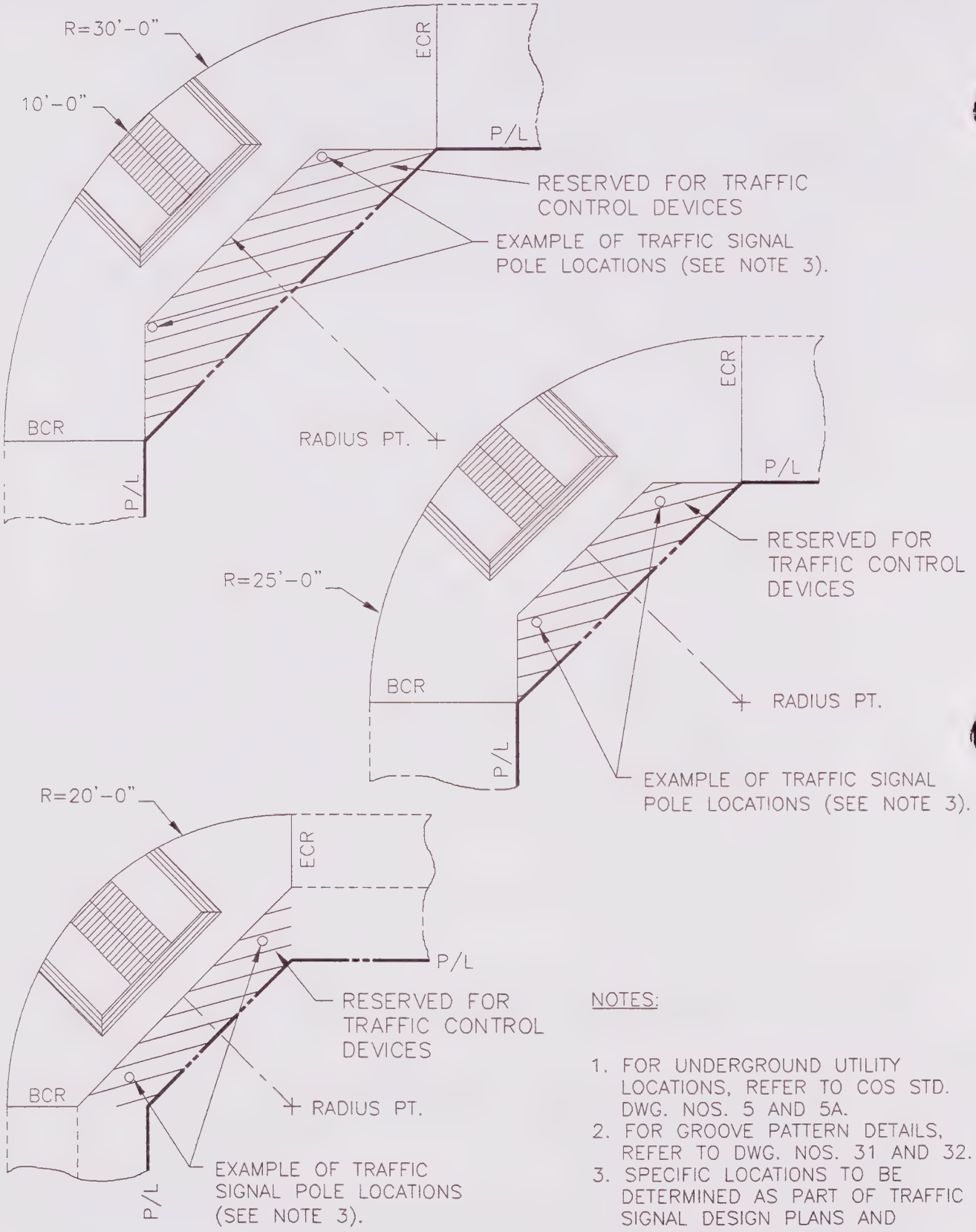
REV. NO.	REV. DATE	REV. BY	TRAFFIC SIGNAL MAST ARM SIGN ASSEMBLY	REVISION APPROVED BY CITY ENGINEER Finbar J. O'Regan DATE: 01/09/02	
3	6/1/2000	HLE/RH			
DIGITIZED	7/1/91				
DWG. BY RC	SCALE		CITY OF STOCKTON DEPARTMENT OF PUBLIC WORKS	SUPERCEDES DWG. DATED 10/7/93	DRAWING NO. 117
CK. BY	NONE				

(CONT'D FROM DWG. 117)

NOTES FOR TRAFFIC-SIGNAL-ARM SIGN MOUNTING:

1. ALL MATERIAL FURNISHED SHALL BE RUST RESISTANT. ALL SIGN HARDWARE SHALL BE ALUMINUM AND ANY MOVING PARTS MUST BE MADE OF STAINLESS STEEL TO PREVENT RUSTING.
2. THE SIGN MOUNTING EXTRUDED ALUMINUM MOUNTING BRACKETS SHALL BE EITHER MEDIUM ALUMINUM EXTRUSIONS (SIGNFIX PART NO. HPN-053) OR LARGER ALUMINUM EXTRUSIONS (SIGNFIX PART NO. HPN-055). EXTRUDED ALUMINUM MOUNTING BRACKETS MUST BE BY SIGNFIX OR MUST BE DIRECTLY ADAPTABLE TO UNIVERSAL SIGNFIX CHANNEL CLAMPS E.P. (PART NO. HPN-034EP) OR EQUAL. FLARED LEG MOUNTING BRACKET FOR MOUNTING TO POLE OR MAST ARM SHALL BE HAWKINS PART NO. M2G-FUB OR APPROVED EQUAL. THREADED PORTION OF BRACKET SHALL ACCEPT COURSE THREAD 5/16 INCH ALL-THREAD BOLT.
3. SINGLE STREET NAME SIGN SHALL HAVE NAME AND SUFFIX CENTERED IN SIGN. SIGNS SHALL BE SINGLE FACE AND FABRICATED ON ALUMINUM BLANKS 0.063-INCH THICKNESS. BLANK SHALL BE 18-INCHES IN WIDTH AND VARY IN LENGTH DEPENDING ON THE NUMBER OF LETTERS OF THE STREET (MIN. OF 6-FEET IN LENGTH). SIGN BLANK SHALL HAVE GREEN BACKGROUND USING 3M ENGINEER'S GRADE REFLECTIVE VINYL SHEETING. UPPER CASE LETTERS SHALL BE 10-INCHES AND LOWER CASE LETTERS SHALL BE 7.5-INCHES. ALL LETTERS SHALL BE HIGHWAY FONT "D". SIGN SHALL HAVE 1-INCH WHITE BORDER COVERING THE ENTIRE EDGE OF SIGN BLANK. CORNERS SHALL BE NEATLY ROUNDED TO A 3-INCH RADIUS. WORDS SHALL BE SPACED 10-INCHES APART AND THERE SHALL BE 10-INCHES OF SPACING BETWEEN BORDER AND SIDES OF STREET NAME. LETTERS SHALL BE SPACED A MIN. OF 1.5-INCHES.
4. VARIOUS STREETS IN THE CITY CHANGE NAMES AT MAJOR INTERSECTIONS. SIGNS THAT DESIGNATE DIFFERENT NAMES SHALL BE MADE AS PER STANDARD DWG. NO. 117.
5. ALL SIGNS SHALL BE APPROVED FOR CONFORMANCE BY THE CITY TRAFFIC DEVICES STAFF PRIOR TO INSTALLATION.

REV. NO.	REV. DATE	REV. BY	TRAFFIC SIGNAL MAST ARM SIGN ASSEMBLY	REVISION APPROVED BY CITY ENGINEER
3	6/1/2000	HLE/RH		Finbar J. O'Regan
DIGITIZED	7/1/91			DATE: 01/09/02
DWG. BY RC	SCALE		CITY OF STOCKTON	SUPERCEDES DWG. DATED 10/7/93 / DRAWING NO. 117A
CK. BY	NONE		DEPARTMENT OF PUBLIC WORKS	



NOTES:

1. FOR UNDERGROUND UTILITY LOCATIONS, REFER TO COS STD. DWG. NOS. 5 AND 5A.
2. FOR GROOVE PATTERN DETAILS, REFER TO DWG. NOS. 31 AND 32.
3. SPECIFIC LOCATIONS TO BE DETERMINED AS PART OF TRAFFIC SIGNAL DESIGN PLANS AND INCORPORATED INTO THE IMPROVEMENT PLANS.

REV. NO.	REV. DATE	REV. BY
1	6/1/2000	HLE/RH
DIGITIZED	7/1/91	
DWG. BY	RC	SCALE
CK. BY	DW	NONE

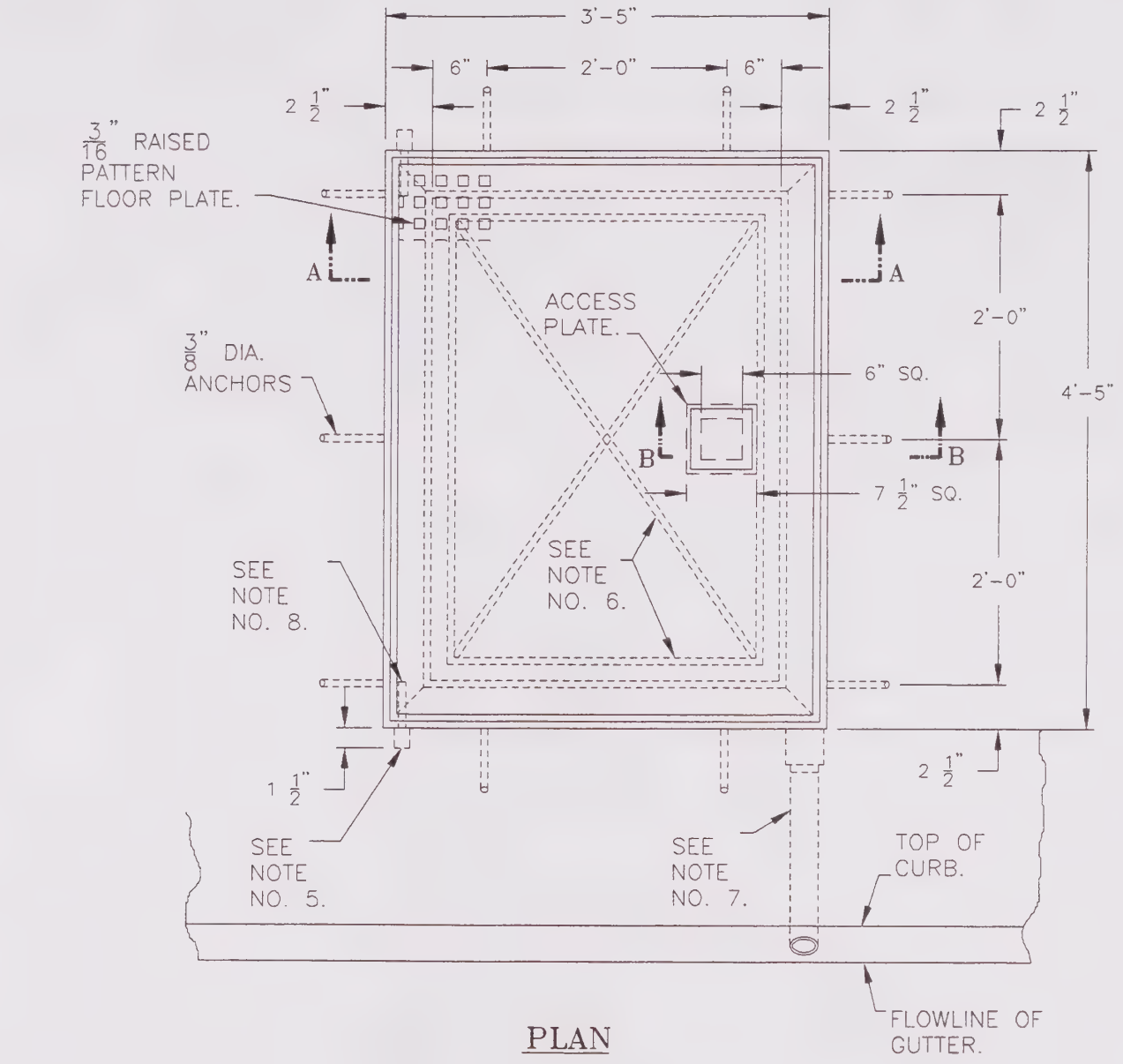
TRAFFIC CONTROL DEVICE LOCATIONS IN NEW SUBDIVISIONS

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

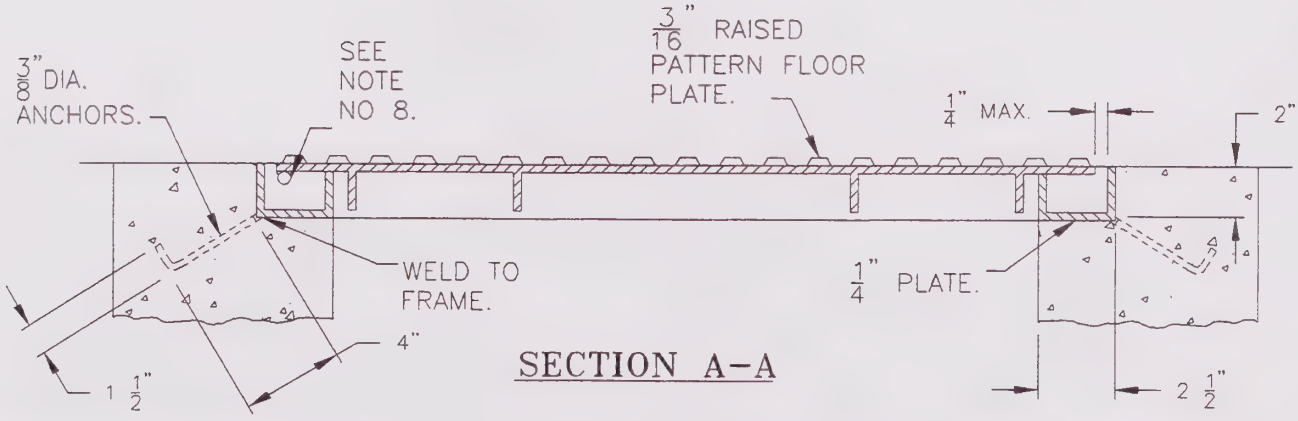
REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 01/09/02

SUPERCEDES DWG. DATED 7/1/91

DRAWING NO. 118



PLAN



SECTION A-A

REV. NO.	REV. DATE	REV. BY
3	6/1/2000	HLE/RH
DIGITIZED	1/1/92	

SIDEWALK VAULT ACCESS DOOR

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 01/09/02

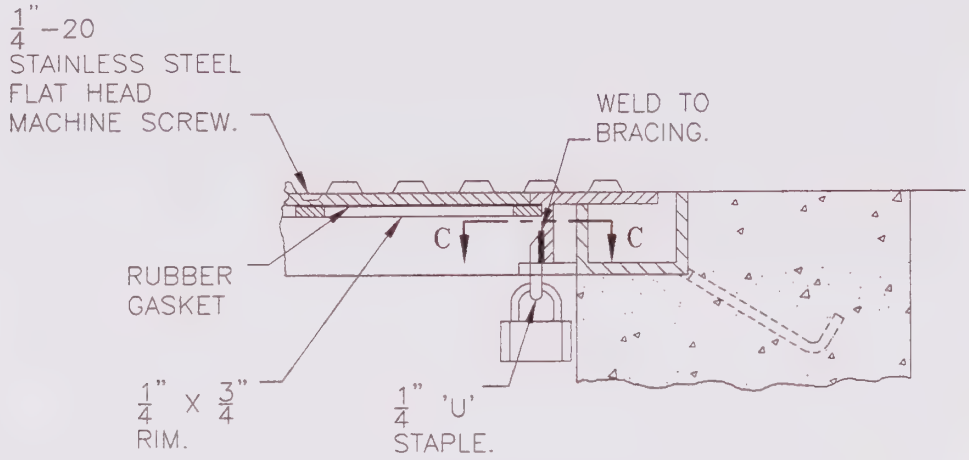
DWG. BY	RC	SCALE
CK. BY		NONE

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

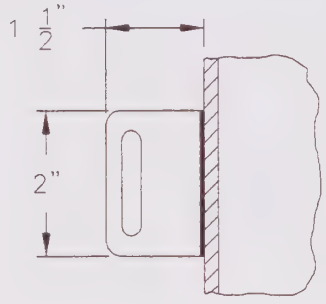
SUPERCEDES DWG. DATED 10/7/93

DRAWING NO. 120

(CONT'D FROM DWG. 120)



SECTION B-B



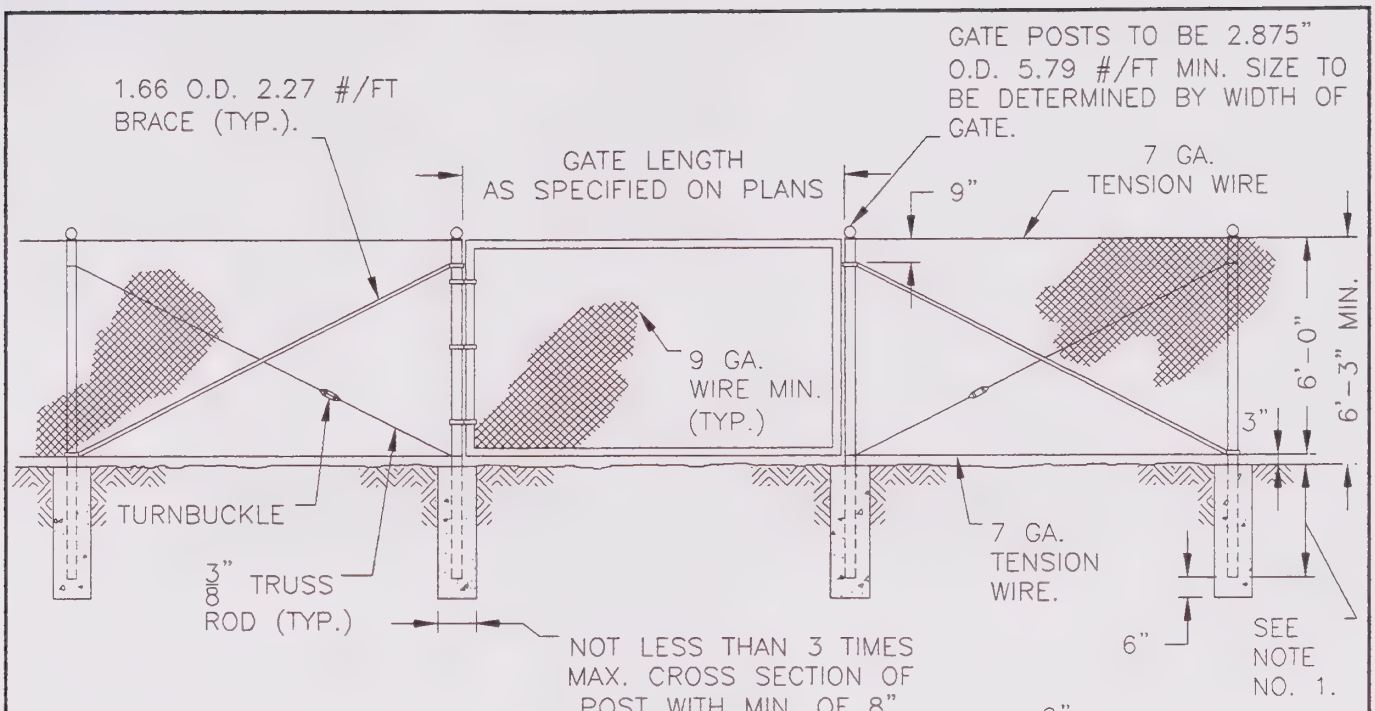
SECTION C-C

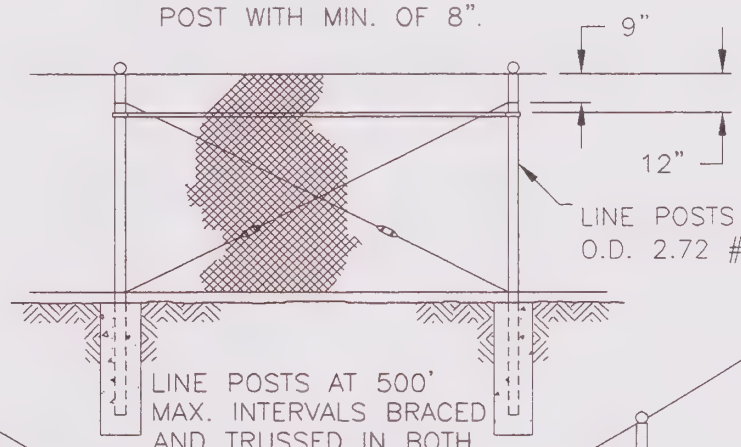
NOTES:

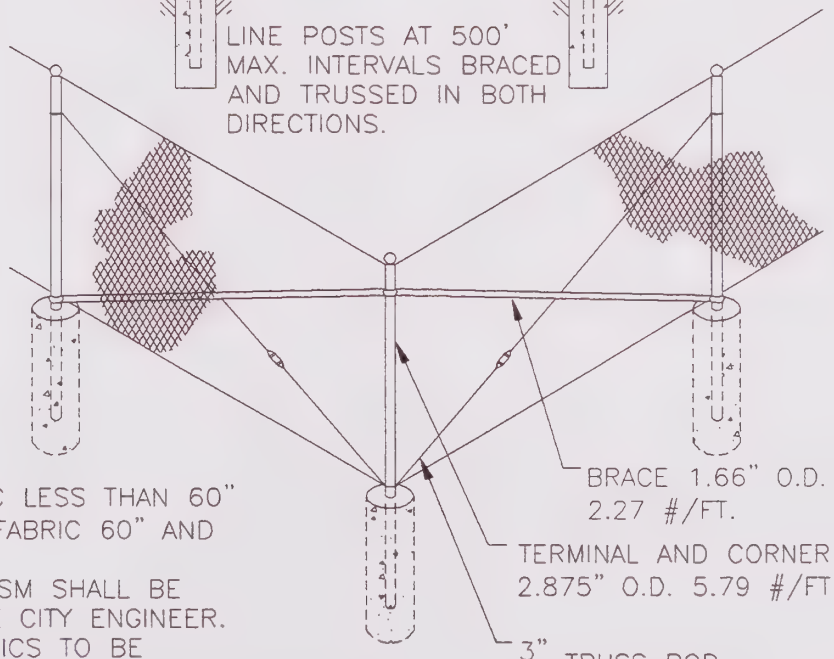
WHERE AN OPEN GRATE IS USED, THE REQUIREMENTS ARE AS FOLLOWS:

1. GRATE SHALL HAVE 1/2" MAXIMUM WIDTH OPENINGS.
2. OPENINGS TO BE PERPENDICULAR TO CURB.
3. SIDEWALK SLAB ADJACENT TO THE VAULTS AND THE GRATE SHALL BE DESIGNED FOR 100 LBS./SQ. FT. MINIMUM LOADING.
4. VAULT ACCESS DOOR SHALL BE GALVANIZED PRIOR TO INSTALLATION.
5. 3/4" I.D. TUBING WITH 0.12" WALL. CLOSE END, PACK WITH GREASE.
6. 3/16" x 1-1/2" FLAT BRACES.
7. 1-1/4" STANDARD PIPE COUPLING WITH 1-1/4" PIPE DRAIN TO CURB.
8. 5/8" DIA. x 3" BAR TO EXTEND 1" FROM FLOOR PLATE (WELD TO FLOOR PLATE).

REV. NO.	REV. DATE	REV. BY	SIDEWALK VAULT ACCESS DOOR	REVISION APPROVED BY CITY ENGINEER
3	6/1/2000	HLE/RH		Finbar J. O'Regan
DIGITIZED	1/1/92			DATE: 01/09/02
DWG. BY RC	SCALE		CITY OF STOCKTON	SUPERCEDES DWG. DATED
CK. BY	NONE		DEPARTMENT OF PUBLIC WORKS	10/7/93
				DRAWING NO. 120A







NOTES:

1. 2'-6" FOR FABRIC LESS THAN 60" HIGH 3'-0" FOR FABRIC 60" AND OVER.
2. LOCKING MECHANISM SHALL BE APPROVED BY THE CITY ENGINEER.
3. LATCHING MECHANICS TO BE APPROVED BY THE ENGINEER.

REV. NO.	REV. DATE	REV. BY
3	6/1/2000	HLE/RH
DIGITIZED	1/1/92	

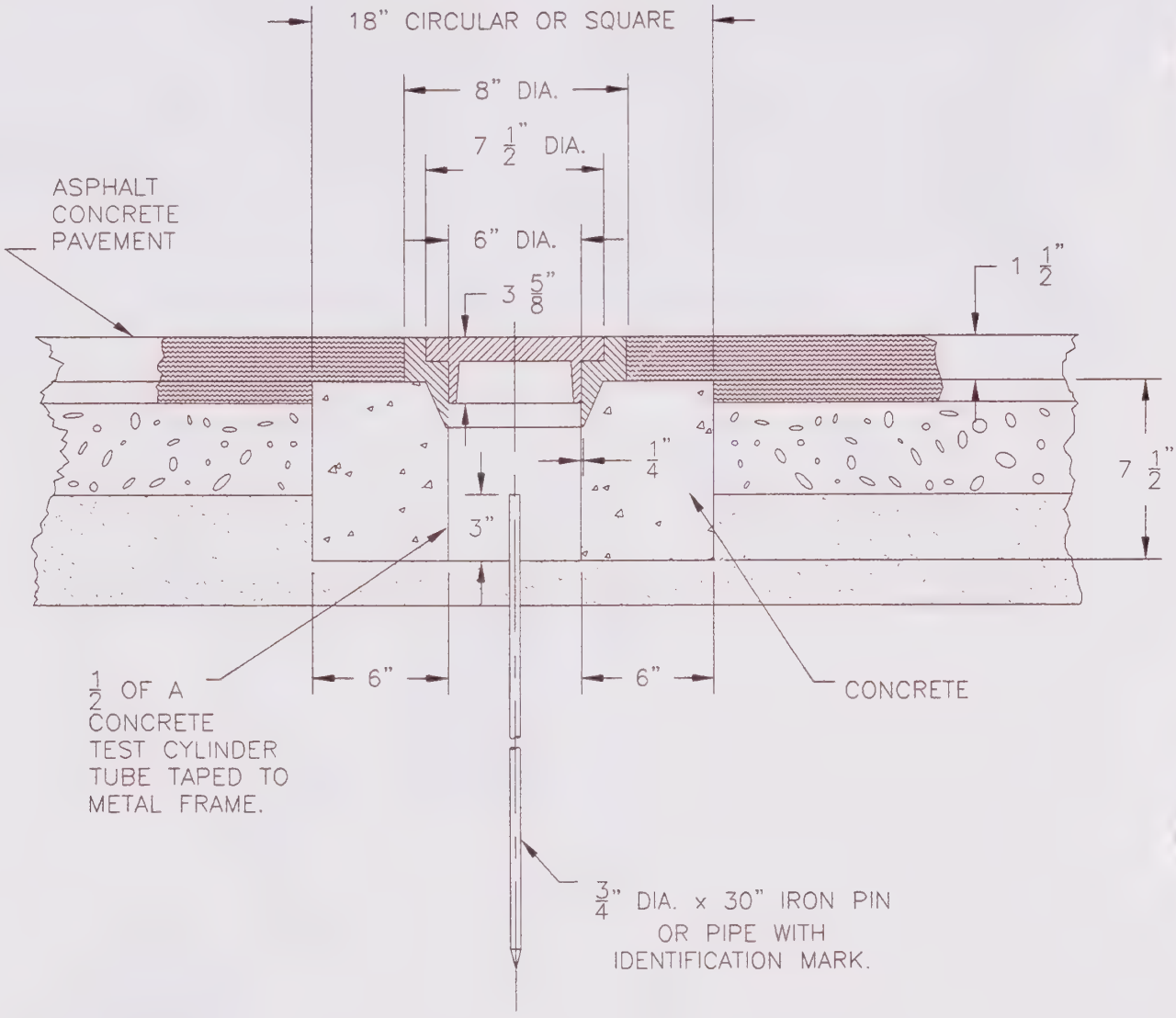
CHAIN LINK FENCE & GATE

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 01/09/02

DWG. BY	RC	SCALE
CK. BY		NONE

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

SUPERCEDES DWG. DATED	DRAWING NO.
2/23/95	121



NOTES:

1. SET MONUMENT, FRAME AND COVER AFTER PAVEMENT IS IN PLACE.
2. MONUMENT FRAMES AND COVERS SHALL BE TOUGH GREY IRON CASTING CONFORMING TO THE LATEST A.S.T.M. REQUIREMENTS. EACH COVER SHALL BE GROUND OR OTHERWISE FINISHED SO THAT IT WILL FIT ITS FRAME WITHOUT ROCKING.
3. FRAME AND COVER TO BE "PINKERTON FOUNDRY" # A-581M. AMERICAN BRASS AND IRON, OR EQUAL. CAST IRON COVER TO BE MARKED "MONUMENT."
4. MONUMENTS TO BE SET AT ALL INTERSECTIONS, ENDS OF CUL-DE-SACS AT B.C. & E.C. OF CURVES, AND AT ENDS OF SUBDIVISION. ON LONG TANGENTS, THE MAXIMUM DISTANCE BETWEEN MONUMENTS SHALL NOT EXCEED 800', MONUMENTS SHALL BE EQUALLY SPACED.

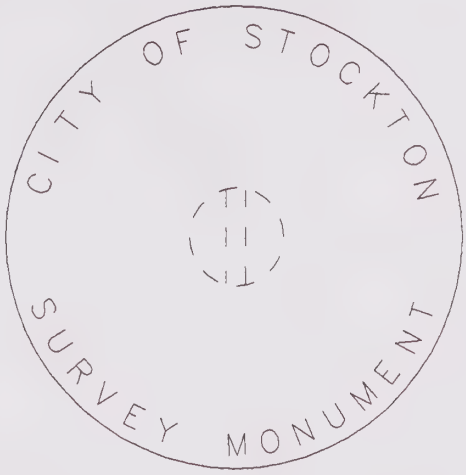
REV. NO.	REV. DATE	REV. BY
5	6/1/2000	HLE/RH
DIGITIZED	1/1/92	
DWG. BY	RC	SCALE
CK. BY		NONE

CITY MONUMENT

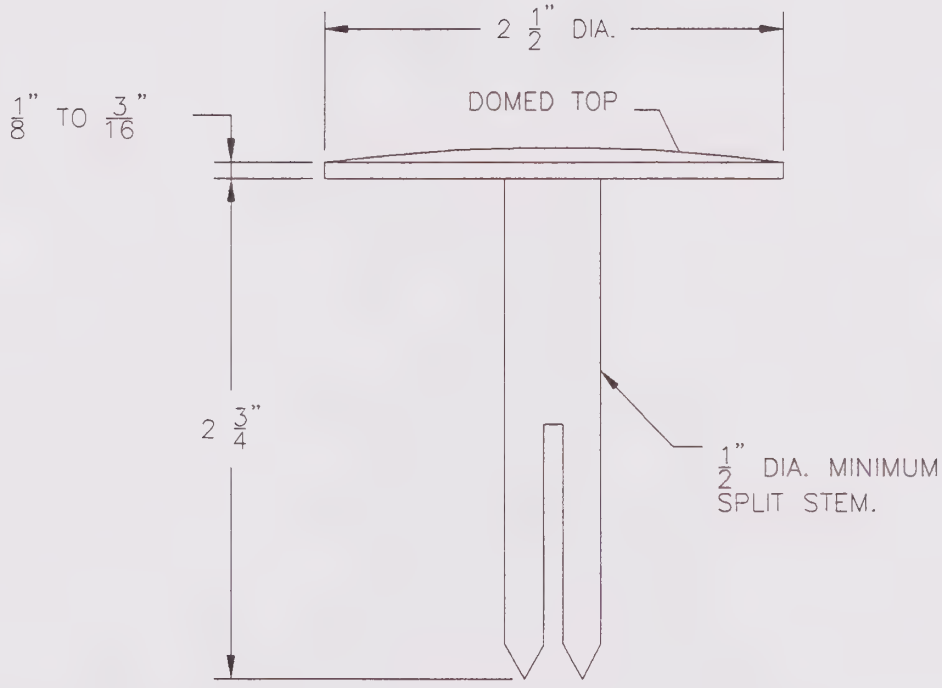
CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbarr J. O'Regan
DATE: 01/09/02

SUPERCEDES DWG. DATED	DRAWING NO.
2/23/95	122



PLAN

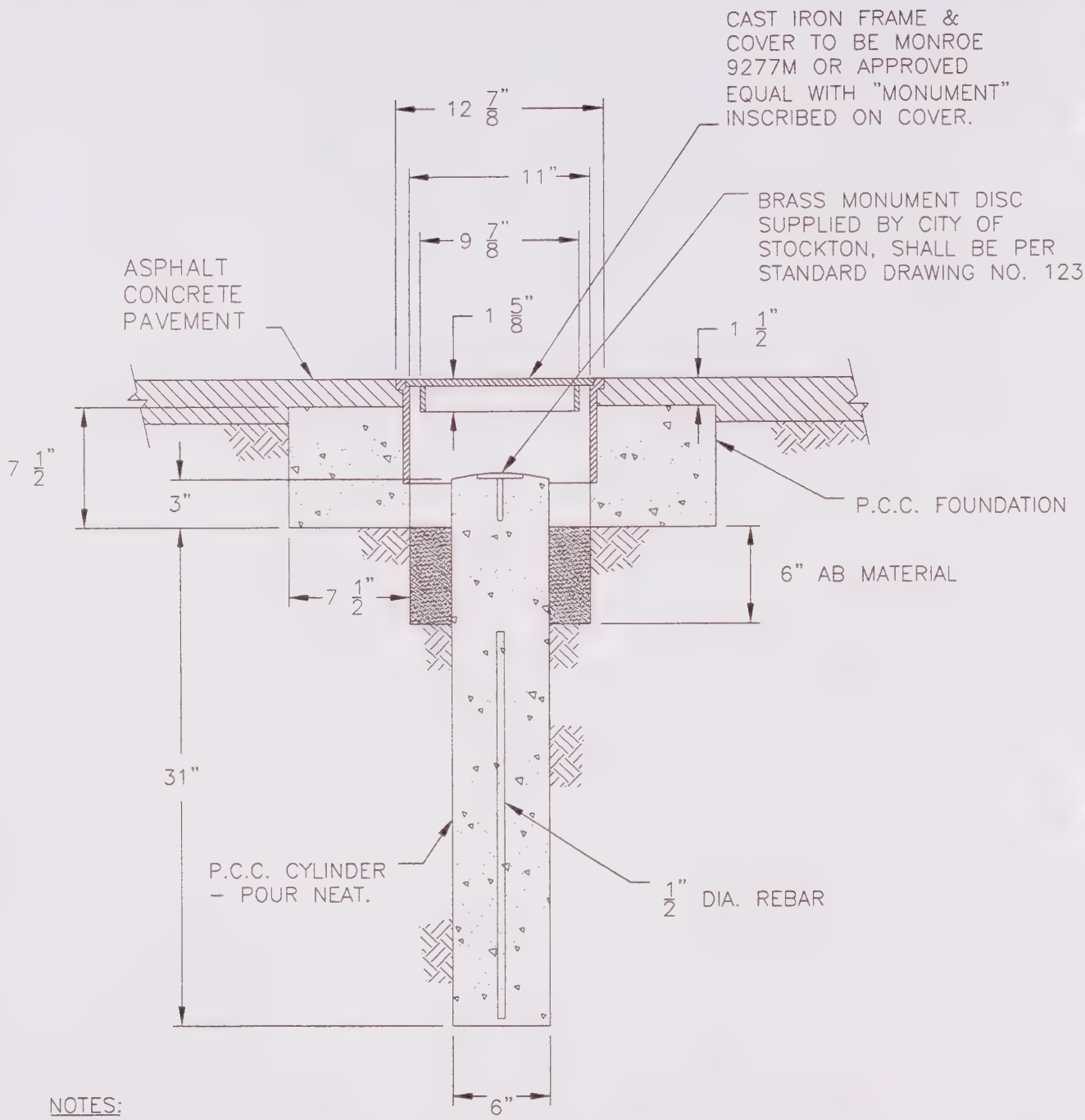


ELEVATION

NOTE:

THIS MARKER IS FOR USE IN C.O.S. SPECIAL MONUMENT INSTALLATIONS PER STANDARD DRAWING 124.

REV. NO.	REV. DATE	REV. BY	SURVEY MONUMENT MARKER	REVISION APPROVED BY CITY ENGINEER
1	6/1/94	MM		Finbar J. O'Regan
DIGITIZED	1/1/92			DATE: 01/09/02
DWG. BY RC	SCALE		CITY OF STOCKTON	SUPERCEDES DWG. DATED 12/15/78
CK. BY	NONE		DEPARTMENT OF PUBLIC WORKS	DRAWING NO. 123



NOTES:

1. MONUMENT FRAME AND COVER SHALL CONFORM TO THE CURRENT A.S.T.M. SPECIFICATIONS. COVER SHALL BE GROUND OR OTHERWISE FINISHED SO THAT IT WILL FIT THE FRAME WITHOUT ROCKING.
2. EXTENSION GRADE RINGS MUST BE AVAILABLE FOR FRAME AND COVER (USE MONROE 9278 OR EQUAL).
3. STAMP IDENTIFICATION MARK ON BRASS DISC OF LICENSED INDIVIDUAL SETTING MONUMENT.
4. MONUMENTS TO BE INSTALLED AT THE INTERSECTION OF ARTERIAL STREETS AS ESTABLISHED IN THE CITY OF STOCKTON GENERAL PLAN.

REV. NO.	REV. DATE	REV. BY
2	6/1/2000	HLE/RH
DIGITIZED	1/1/92	
DWG. BY	RC	SCALE
CK. BY		NONE

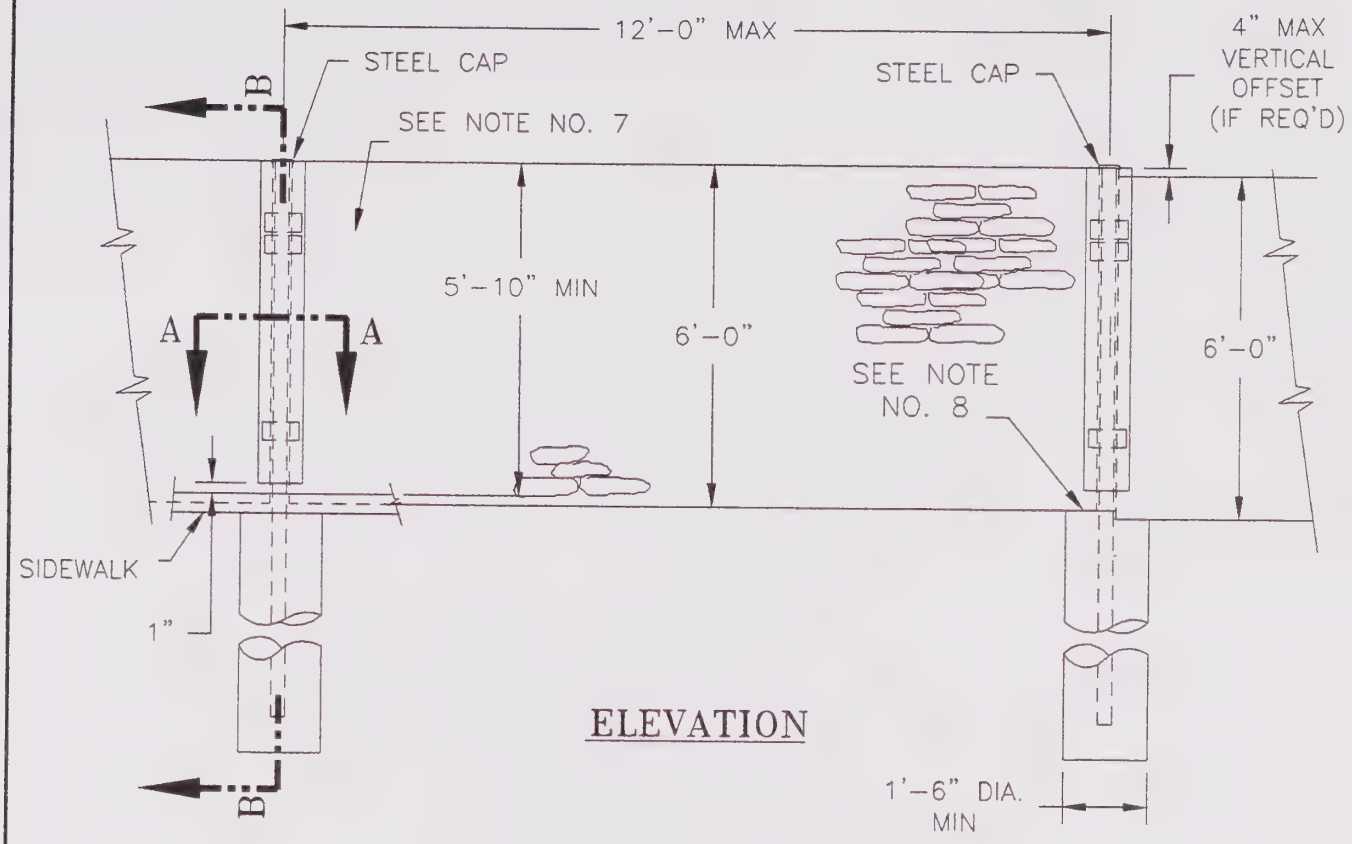
SPECIAL MONUMENT INSTALLATION

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

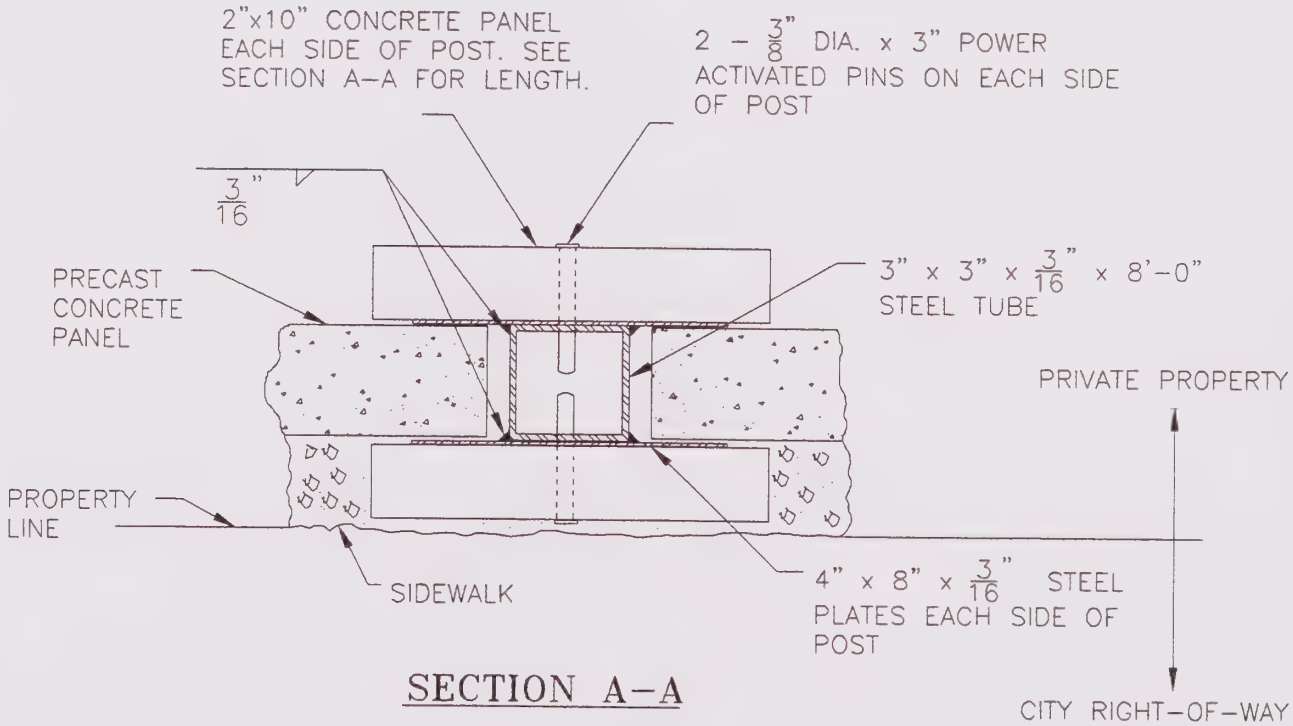
REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 01/09/02

SUPERCEDES DWG. DATED 10/7/93

DRAWING NO. 124



ELEVATION



SECTION A-A

REV. NO.	REV. DATE	REV. BY
3	6/1/2000	HLE/RH
DIGITIZED	1/1/92	
DWG. BY	RC	SCALE
CK. BY		NONE

WALL FOR LOTS ADJACENT TO STREET RIGHT-OF-WAY

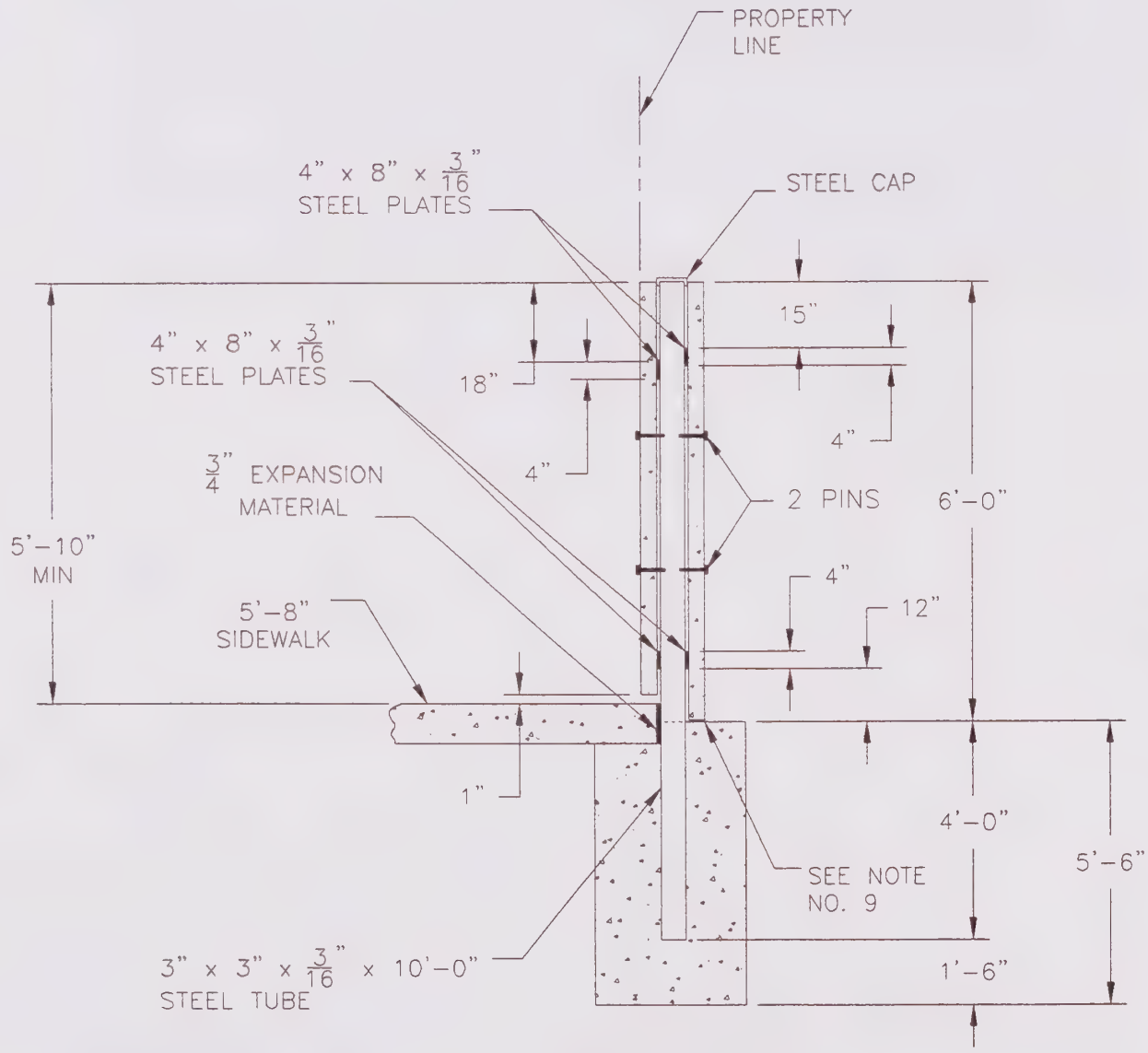
CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbarr J. O'Regan
DATE: 01/09/02

SUPERCEDES DWG. DATED 2/23/95

DRAWING NO. 125

(CONT'D FROM DWG. 125)



SECTION B-B

REV. NO.	REV. DATE	REV. BY
3	6/1/2000	HLE/RH
DIGITIZED	1/1/92	
DWG. BY	RC	SCALE
CK. BY		NONE

WALL FOR LOTS ADJACENT TO STREET RIGHT-OF-WAY

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 01/09/02

SUPERCEDES DWG. DATED	DRAWING NO.
2/23/95	125A

(CONT'D FROM DWG. 125A)

NOTES:

1. THIS DRAWING IS A GUIDELINE ONLY. ALL FENCE DESIGNS MUST BE APPROVED BY THE CITY ENGINEER. THIS DETAIL IS FOR PRECAST CONCRETE FENCE ONLY. ALL FENCES SHALL BE CONSTRUCTED ALONG BACK-UP LOTS IN ACCORDANCE WITH STANDARD DRAWING NO. 15.
2. DESIGN AND CONSTRUCTION SHALL CONFORM TO LATEST EDITION OF THE UNIFORM BUILDING CODE.
3. MINIMUM FOUNDATION CONCRETE SHALL BE CLASS "B" PRECAST PANEL SHALL BE CLASS "A" WITH PAINTED GOLDENROD COLOR. COLOR SAMPLE SHALL BE APPROVED BY THE CITY ENGINEER.
4. REINFORCING STEEL SHOULD BE A.S.T.M. DESIGNATION A615 GRADE 40.
5. STEEL POSTS TO BE A.S.T.M. DESIGNATION A36.
6. HOMEOWNERS ASSOCIATION OR MAINTENANCE DISTRICT IS REQUIRED FOR MAINTAINING ALL BACKUP LOT WALLS INCLUDING ALL AREAS BEHIND THE PROPERTY LINE.
7. 14'-0" x 6'-0" x 3" PRECAST CONCRETE PANEL WITH 4" x 16" STAMPED ADOBE SURFACE FACING STREET. PATTERN TO BE APPROVED BY THE CITY ENGINEER. PANEL TO HAVE 5-NO.4 REBAR VERTICAL AND 5-NO.4 REBAR HORIZONTAL.
8. TOP OF FOOTINGS TO BE TROWELED SMOOTH TO PROVIDE FULL BEARING FOR CONCRETE PANEL.
9. 2" x 10" TO REST ON TOP OF FOUNDATION.
10. SEE STD. DWG. NO. 9 FOR CORNER SIGHT DISTANCE RESTRICTIONS.

REV. NO.	REV. DATE	REV. BY
3	6/1/2000	BLE/RH
DIGITIZED	1/1/92	
DWG. BY	RC	SCALE
CK. BY		NONE

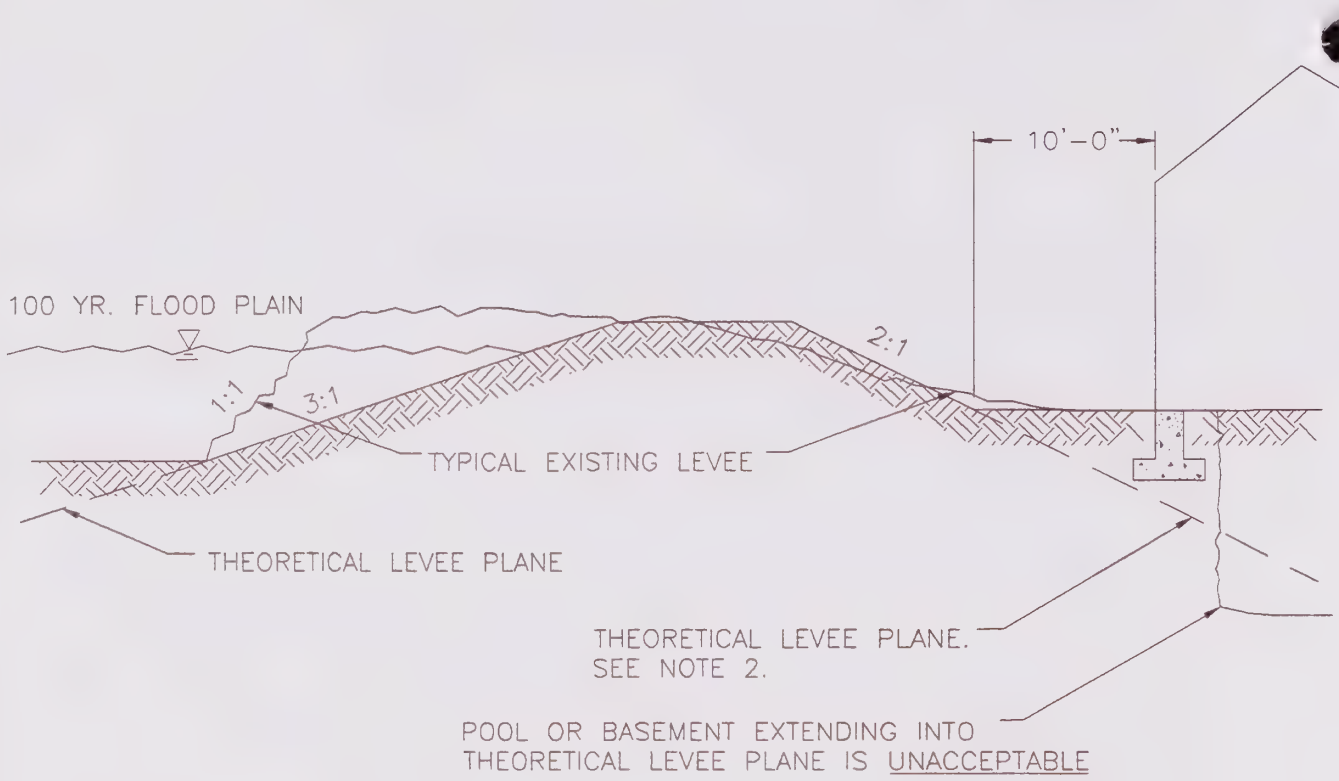
WALL FOR LOTS ADJACENT TO STREET RIGHT-OF-WAY

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbarr J. O'Regan
DATE: 01/09/02

SUPERCEDES DWG. DATED	DRAWING NO.
2/23/95	125B

G:\PW\PRIV\PUBLIC WORKS\ACAD\DRAWINGS\STDS_2000\120_129\125B.DWG



NOTES:

1. NO CONSTRUCTION WITHIN 10'-0" OF TOE OF SLOPE.
2. NO PENETRATION OF THEORETICAL LEVEE PLANE.

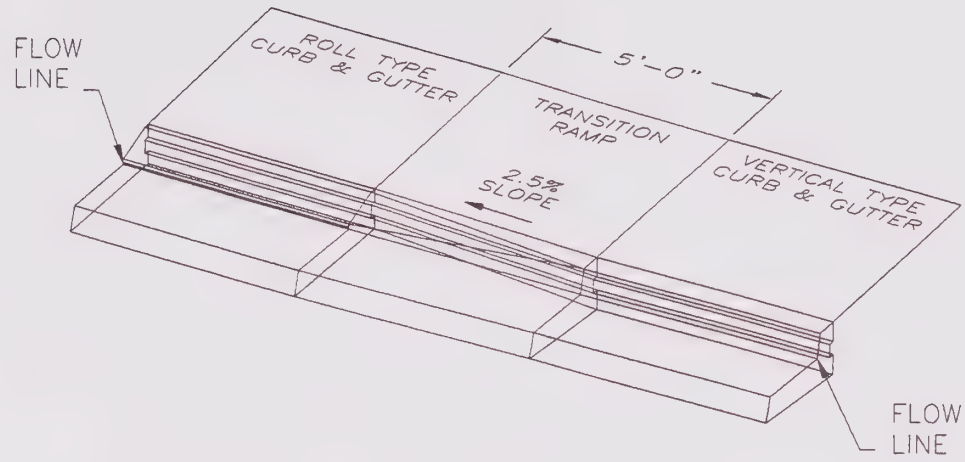
REV. NO.	REV. DATE	REV. BY
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DWG. BY	RC	SCALE
CK. BY		NONE

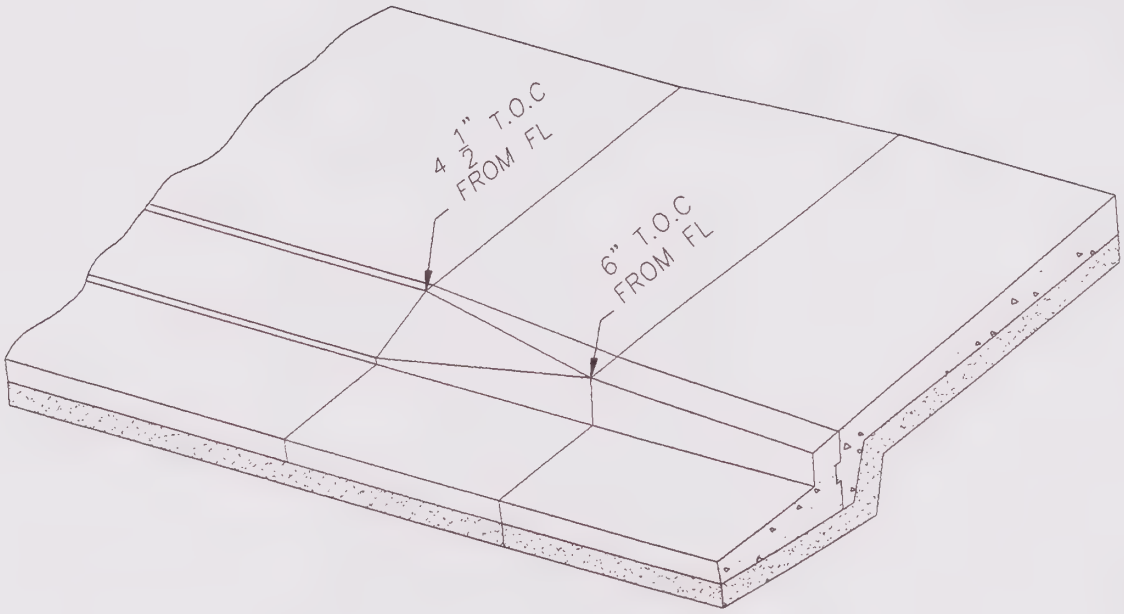
BUILDING SETBACKS ADJACENT TO LEVEES

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 01/09/02

SUPERCEDES DWG. DATED	DRAWING NO.
7/1/83	126





3-D VIEW

NOTES:

1. MINIMUM TRANSITION LENGTH IS 5'-0". IF LESS THAN 5'-0", NEED CITY ENGINEER APPROVAL.
3. MAXIMUM TRANSITION SLOPE IS 2.5%.

REV. NO.	REV. DATE	REV. BY	ROLL CURB TO VERTICAL CURB TRANSITION	NEW DRAWING APPROVED BY CITY ENGINEER Finbar J. O'Regan DATE: 01/09/02	
	6/1/2000				
DIGITIZED 6/1/2000					
DWG. BY HLE	SCALE		CITY OF STOCKTON DEPARTMENT OF PUBLIC WORKS	SUPERCEDES DWG. DATED	DRAWING NO. 127
CK. BY	NONE				

DESCRIPTION	UNIT	UNIT PRICE
Site Preparation and Grading		
Clearing and Grubbing	Acre	$500.00
Remove exist pavement	SF	$1.00
Remove exist pavement	CY	$25.00
Remove concrete sidewalk	CY	$15.00
Remove concrete curb and gutter	CY	$15.00
Remove concrete underground R.C.C. structures	CY	$30.00
Remove concrete culverts	LF	$10.00
Remove exist abandoned utitilties	LF	$10.00
Tree removal	EA	$150.00
Remove barricade	EA	$500.00
Earthwork	CY	$2.00
Imported fill	CY	$12.00
Lot grading	EA	$1,000.00
Retaining wall, < 2-ft	LF	$30.00
Retaining wall, < 3-ft	LF	$40.00
Tree protection	EA	$300.00
Tree planting	EA	$500.00
Erosion Control		
Still fence	LF	$6.00
Straw bale barrier - complete	EA	$200.00
Stablized construction entrance	EA	$1,000.00
Erosion control	Acre	$2,000.00
Water		
6" DIP	LF	$18.00
6" PVC	LF	$15.00
8" DIP	LF	$22.00
8" PVC	LF	$18.00
12" PVC	LF	$30.00
16" DIP	LF	$40.00
16" PVC	LF	$36.00
6" valve	EA	$650.00
8" valve	EA	$750.00
12" valve	EA	$1,200.00
12" b'fly valve	EA	$1,500.00
16" valve	EA	$2,300.00

REV. NO.	REV. DATE	REV. BY

DIGITIZED 6/1/2003

DWG. BY HLE SCALE

CK. BY

2004 UNIT PRICE LIST FOR LAND DEVELOPMENT PROJECTS

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 11/25/03

SUPERCEDES DWG. DATED

DRAWING NO. 128 (1/5)

DESCRIPTION	UNIT	UNIT PRICE
Water		
Hydrant bury, valve, and tee	EA	$2,500.00
Connect to exist water–incl isolation ass'y	EA	$2,000.00
1" service to new water	EA	$400.00
1" service to exist water	EA	$700.00
2" blowoff	EA	$800.00
Air release valve	EA	$1,000.00
Steel casing	LF	varies $2.00 per inch of diameter
Corrosion monitoring test station	EA	$10.00
Sanitary		
6" VCP	LF	$15.00
6" PVC	LF	$12.00
8" VCP	LF	$22.00
8" PVC	LF	$20.00
10" VCP	LF	$25.00
10" PVC	LF	$22.00
12" VCP	LF	$30.00
12" PVC	LF	$25.00
15" PVC	LF	$40.00
18" PVC	LF	$50.00
Sanitary sewer manhole–Type 1	EA	$2,000.00
Sanitary sewer manhole–Type 2	EA	$2,200.00
Sanitary sewer manhole–Type 3	EA	$2,500.00
Sanitary sewer manhole–Depth greater than 18'	EA	$4,000.00
Drop manhole	EA	$3,000.00
60" diameter manhole	EA	$4,000.00
Lamphole	EA	$500.00
Clean out	EA	$500.00
Connet to exist	EA	$1,000.00
Lateral on new mains	EA	$400.00
Lateral on exist mains	EA	$700.00
Lateral	EA	$400.00
Lateral–Depth greater than 12'	EA	$1,000.00
Plug end	EA	$200.00

REV. NO.	REV. DATE	REV. BY

DIGITIZED 6/1/2003

DWG. BY HLE SCALE

CK. BY

2004 UNIT PRICE LIST FOR LAND DEVELOPMENT PROJECTS

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 11/25/03

SUPERCEDES DWG. DATED

DRAWING NO. 128 (2/5)

DESCRIPTION	UNIT	UNIT PRICE
Storm		
Field inlet	EA	$1,200.00
Catch basin – Type 1	EA	$1,500.00
Catch basin – Type 2	EA	$1,800.00
Storm drain manhole – Type 1	EA	$2,000.00
Storm drain manhole – Type 2	EA	$2,500.00
Storm drain manhole – Type 3	EA	$2,800.00
60" manhole	EA	$3,000.00
72" manhole	EA	$4,000.00
12" RCP	LF	$22.00
15" RCP	LF	$25.00
18" RCP	LF	$33.00
24" RCP	LF	$40.00
30" RCP	LF	$50.00
36" RCP	LF	$60.00
48" RCP	LF	$90.00
60" RCP	LF	$125.00
Plug end	EA	$200.00
Connect To Existing	EA	$750.00
Streets		
6–in vert curb and gutter	LF	$10.00
4–1/2" roll curb and gutter	LF	$8.00
8" median curb	LF	$10.00
Sidewalk, incl ramp and return	SF	$4.00
Sidewalk	SF	$2.50
HC ramp–labor	EA	$750.00
HC ramp	EA	$750.00
Curb return, incl. ramp	EA	$1,500.00
Mid–block HC ramp	EA	$750.00
Residential driveway apron	SF	$3.00
Driveway approach	EA	$500.00
Commercial driveway – Type 27	EA	$1,500.00
Commercial driveway – Type 38	EA	$2,000.00
Fine grading	SF	$0.20
0.10–ft overlay	SF	$0.50
0.25–ft overlay	SF	$0.75
2.5" A.C./4" A.B.	SF	$1.20
3" A.C./5" A.B.	SF	$1.50

REV. NO.	REV. DATE	REV. BY

DIGITIZED 6/1/2003

DWG. BY HLE SCALE

CK. BY

2004 UNIT PRICE LIST FOR LAND DEVELOPMENT PROJECTS

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 11/25/03

SUPERCEDES DWG. DATED

DRAWING NO. 128 (3/5)

DESCRIPTION	UNIT	UNIT PRICE
Streets		
5" A.C./12" A.B.	SF	$2.50
3" A.C.	SF	$0.75
3-1/2" A.C.	SF	$0.88
4" A.C.	SF	$1.00
5" A.C.	SF	$1.25
6" A.C.	SF	$1.50
7" A.C.	SF	$1.75
8" A.C.	SF	$2.00
9" A.C.	SF	$2.25
10" A.C.	SF	$2.50
11" A.C.	SF	$2.75
7" A.B.	SF	$0.70
9" A.B.	SF	$0.90
11" A.B.	SF	$1.10
Sawcut	LF	$1.00
A.C. dike	LF	$5.00
Grind	SF	$0.25
Fog seal	SF	$0.20
Slurry	SF	$0.50
Street lights		
100-watt	EA	$2,000.00
150-watt	EA	$2,200.00
200-watt	EA	$3,000.00
Double Mast Arm Electrolier	EA	$3,500.00
Elect panel	EA	$1,500.00
Installation of pumps	EA	varies depending on the pump size
Miscellaneous		
Street name sign	EA	$250.00
Traffic sign	EA	$250.00
Stop sign with street name sign and striping	EA	$500.00
Traffic signal	EA	$250,000.00
Fiber conduit	EA	$12,500.00
Delineators	EA	$200.00

REV. NO.	REV. DATE	REV. BY

DIGITIZED 6/1/2003

DWG. BY HLE | SCALE

CK. BY

2004 UNIT PRICE LIST FOR
LAND DEVELOPMENT PROJECTS

CITY OF STOCKTON
DEPARTMENT OF PUBLIC WORKS

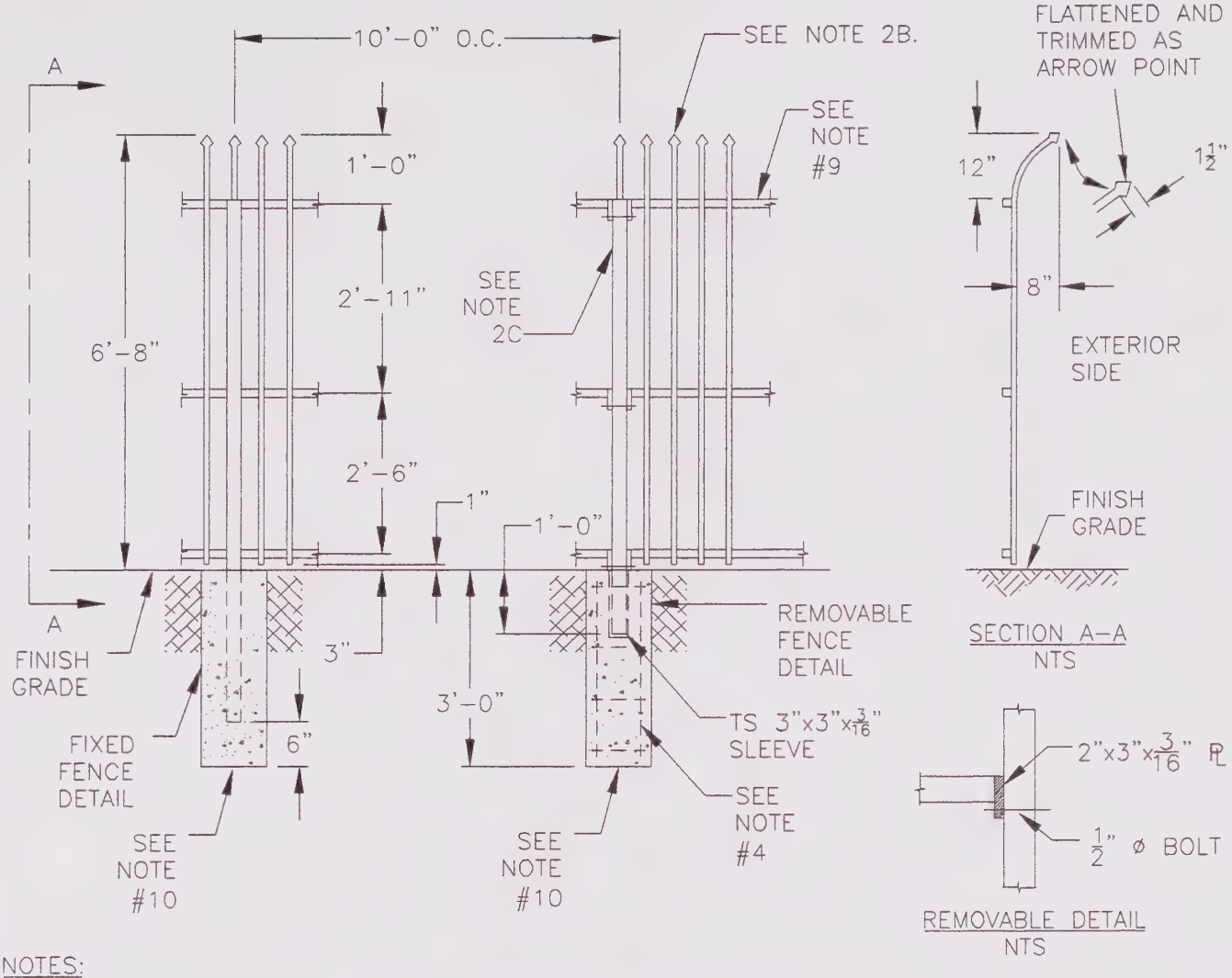
REVISION APPROVED BY CITY ENGINEER
Finbar J. O'Regan
DATE: 11/25/03

SUPERCEDES DWG. DATED

DRAWING NO.
128 (4/5)

DESCRIPTION	UNIT	UNIT PRICE
Miscellaneous		
Bike path	LF	$12.50
Street monument	EA	$250.00
Survey monument	EA	$500.00
Timber barricade	LF	$25.00
Landscape with irrigation	SF	$3.50
6" high fencing	LF	$25.00
Fencing removal	LF	$5.00
Masonry wall	LF	$48.00
Retaining wall	LF	$85.00

REV. NO.	REV. DATE	REV. BY	2004 UNIT PRICE LIST FOR LAND DEVELOPMENT PROJECTS	REVISION APPROVED BY CITY ENGINEER Finbar J. O'Regan DATE: 11/25/03
DIGITIZED 6/1/2003				
DWG. BY HLE	SCALE		CITY OF STOCKTON DEPARTMENT OF PUBLIC WORKS	SUPERCEDES DWG. DATED / DRAWING NO. 128 (5/5)
CK. BY				



NOTES:

1) 7'-0" (SEVEN) HIGH COMMERCIAL GRADE CURVED TOP SENTRY STYLE WROUGHT IRON FENCE WITH DOUBLE SWING GATES 16'-0"x7'-0"
2) SENTRY STYLE FENCE AND GATE SPECIFICATIONS:
   A. RAIL: $1\frac{1}{2}$"x$1\frac{1}{2}$"x14 GUAGE.
   B. PICKETS: $\frac{3}{4}$"x$\frac{3}{4}$"x16 GUAGE @ $4\frac{3}{4}$" O.C.
   C. POSTS: $2\frac{1}{2}$"x$2\frac{1}{2}$"x11 GUAGE @ 10'-0" O,C
   D. GATE POSTS: 4"x4"x11 GUAGE
3) ALL WELDED STEEL CONSTRUCTION (UNLESS OTHERWISE NOTED).
4) 4-#4 VERTICAL WITH #3 HOOPS AT 12" O.C. (TYPICAL).
5) WELD CAPS ON ALL POST TUBING.
6) PRIME AND PAINT FENCE HUNTER GREEN.
7) ALL WELDS SHALL BE RE-GALVANIZED AND PROPERLY COATED.
8) INSTALL 12" WIDE x 4" DEPTH CONCRETE BAND (6" FROM CENTERLINE OF FENCE TO EACH SIDE) ALONG FENCE AND GATE ALIGNMENT.
9) TS $1\frac{1}{2}$"x$1\frac{1}{2}$"x13 GA TOP, MID AND BOTTOM RAILS.
10) 12" ø CONCRETE PIER.

REV. NO.	REV. DATE	REV. BY	TUBULAR STEEL FENCE DETAIL	REVISION APPROVED BY CITY ENGINEER Finbar J. O'Regan DATE: 11/25/03
DIGITIZED				
DWG. BY	SCALE		CITY OF STOCKTON DEPARTMENT OF PUBLIC WORKS	SUPERCEDES DWG. DATED / DRAWING NO. 129
CK. BY	NONE			



City of Stockton
Transportation Impact Analysis Guidelines

City of Stockton
Public Works Department
Engineering Division
425 N. El Dorado Street
Stockton, CA 95202
(209) 937-8411

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1. Introduction

The City of Stockton desires to provide a safe and efficient transportation system for its residents and businesses. The purpose of a Transportation Impact Analysis (TIA) is to provide decision makers with sufficient information concerning the impacts of a project on the transportation system and to determine appropriate mitigation measures where impacts exist. A TIA is an important tool that identifies the need for any improvements to a transportation system to reduce congestion, improve safety, provide adequate site access, and mitigate impacts associated with the project.

A TIA must meet the requirements of the California Environmental Quality Act (CEQA). A TIA may be required for any type of development such as residential, commercial, office, industrial or mixed use. As part of the development review process for the City, a TIA needs to be prepared on behalf of a project before a discresionary action (land use zoning change, subdivision map, development application, site plan, new driveways, etc) is approved.

The Transportation Impact Analysis Guidelines shall be used by Consultants for the preparation of all TIAs. The intent of these guidelines is to help assure the conistency and quality of the work product.

2. Scope of the Transportation Impact Analysis

Initial Assessment

A project applicant shall complete and submit Section 1 and Section 2 of Transportation Impact Analysis: Initial Assessment (Form 1, included in Appendix A) at the time that the project application is initally submitted to the Community Development Department. With this information, the Public Works Department will determine the need to prepare a TIA based on an initial assessment of trip generation and transportation impacts. For trip generation, the threshold is 100 or more vehicle trips during the A.M. or P.M. peak hour generated by the project. This condition is generally met if "Yes" is answered to any of the questions in Section 2. Although an individual element of a project may not meet these trip generation thresholds, a TIA may still be required if the project as a whole would generated 100 or more A.M. or P.M. peak hour trips.

A TIA may be required at the discretion of the Public Works Department for sensitive areas where a project may impact an already congested or high-accident location, or when specific site access and safety issues are of concern.

A TIA may not be required if the project is part of a larger development for which a TIA has already been prepared for the City of Stockton. In this instance, it is the project applicant's responsibility to sufficiently demonstrate to the Public Works Department that the project's impacts are consistent with the previously prepared TIA. The Public Works Department shall make the final determination on the sufficency of an existing TIA.

The City is currently updating its General Plan and its long-term roadway needs analysis based on city-wide buildout conditions. Once this analysis is adopted by the City, it may allow for a reduction in the scope of work for some TIA that met certain criteria. In general terms, these criteria would be as follows:

- That the proposed project was the same or similar land use as the land use assumed in the General Plan buildout needs analysis.
- That the proposed project would generate the same or fewer trips as that assumed in the he proposed project was the same or similar land use as the land use assumed in the General Plan buildout needs analysis.
- That the TIA for the proposed project was being conducted within five years after the General Plan buildout needs analysis and revalidation of the Citywide travel demand model.

The State of California Department of Transportation (Caltrans) has jurisdiction over several facilities within the City. These facilities include freeway segmants, ramps, ramp terminals, plus some signalized intersections, unsignalized intersections and urban street segments. Caltrans may require the project applicant to prepare a separate study on traffic impacts to their facilities. Caltrans requirements will be included in the TIA whenever feasible. Generally, Caltrans uses the following criteria as a starting point in determining whether a traffic impact study is needed:

- Project generates over 100 peak hour trips on a State Highway Facility
- Project generates 50 to 100 peak hour trips on a State Highway Facility operating at LOS "C" or LOS "D"
- Project generates 1 to 49 peak hour trips on a State Highway Facility operating at LOS "E" or LOS "F".

Who can conduct a TIA

Only a Professional Civil Engineer or Traffic Engineer, currently registered and in good standing with the California State Board of Professional Engineers and Land Surveyors, may prepare a TIA for the City of Stockton.

The City intends to establish a pre-qualified list of Transportaion Consultants for preparing TIAs to ensure consistency and quality, as well as to limit the time spent by City staff in guiding and reviewing the work by consusltants. Once that list is established, only Consultants on that list can prepare a TIA unless an exception is granted by the Public Works Department.

Scope of Work

Based on the project application materials and Transportation Impact Analysis: Initial Assessment (Form 1), the Public Works Department, in consultation with the Community Development Department and project applicant, will determine the "general" scope of work

for a TIA using the Transportation Impact Analysis: General Scope of Work (Form 2, included in Appendix B.)

Based on this form, the applicant's Consultant shall prepare a draft of a detailed TIA work scope for review by the City. This draft work scope shall be discussed during the TIA scoping meeting.

Prior to starting work on any TIA, a scoping meeting shall be held with the City staff, the Consultant and the project applicant to discuss the project, potential traffic/transporation issues and the scope of the TIA. This scoping meeting is an important forum for the City and project applicant. Typically, the following issues will be discussed:

- What are the potential transportation improvements needed to serve the traffic generated by the project?
- How large of a study area might be appropriate for the TIA?
- Will the project impact traffic on any existing residential streets and how might those impacts be mitigated?
- Will the project aggravate any existing safety hazards or create new ones? If so, how might those hazards be corrected?
- Are there any negative impacts to existing transit, bicycle and/or pedestrian services or facilities?
- Can the proposed development be served by public transportation and does the design encourage transit use?
- Is the design of the development friendly toward bicyclists and pedestrians who need to access the development or who need to pass through or by the development?
- Is the on-site parking sufficient or is there an opportunity to share parking with other adjacent uses?
- How many driveways are needed, and how shall they be designed? Is there a long enough throat for each driveway to accommodate queued vehicles without blocking parking spaces and other cross aisle traffic? Will deceleration lanes be needed?
- For any driveway proposed to be signalized, is the traffic signal warranted and can on-site circulation handle the traffic that will be queuing to wait for a green light?
- Is there sufficient capacity in the roadway link or turn bay to accommodate the anticipated 95% queue? What will be the effect of queue spillback on other movements or upstream intersections?
- Is the development designed to incorporate traffic calming measures or how can it be modified to include this?

While many of the answers to these questions will not be known at the time of the scoping meeting, the Consultant will need to include an analysis of all identified issues in the TIA.

Based on the discussions at the scoping meeting, the Consultant will revise the draft scope of work for the TIA prior to beginning the TIA for the Applicant.

During the course of preparing the TIA, the Consultant shall discuss any additional significant issues identified by the Consultant but not covered in the scope of work with the Public Works Department.

3. Transportation Data

The transportation data (counts, etc.) used in the TIA should be gathered within a one-year period prior to the completion of the TIA, unless an exception is granted by the Public Works Department. Collection of new traffic counts on mainline freeway segments is not expected, but the most recent traffic volume data for freeways that is available from Catrans data sources should be used. Some recent traffic volume data, speed surveys, traffic signal timing plans, and traffic collision data, etc. may be available from the Public Works Department. Past transportation impact analyses, development conditions of approval, and transportation improvement project plans are available for review.

For identified study intersections, turning movement counts shall be conducted on an average Tuesday through Thursday for a 2-hour AM peak period (7 AM to 9 PM) and a 2-hour PM peak period (4 AM to 6 PM) excluding weeks with a holiday. If possible, the counts should be conducted on days when schools are in session. . Intersection counts should be sumarized by 15 minute periods so that the highest one hour period during these peak periods can be identified.

4. Traffic Forecasts

Analysis Scenarios, Peak Hours and Study Area

The basic scenarios for forecasting traffic volumes and analyzing study area intersections and arterials in a TIA are:

1. *Existing Conditions*: Existing traffic volumes based on recent count data.
2. *EPAP Conditions (Existing plus Approved Projects)*: Projected traffic volumes reflecting changes to existing traffic volumes due to relevant approved developments.
3. *EPAP with Proposed Project Conditions (Existing plus Approved Projects plus Project)*: Projected traffic volumes reflecting changes" to EPAP traffic volumes due to the Proposed Project.
4. *Cumulative No Project Conditions:* Projected traffic volumes based on the City's Travel Demand Model under General Plan Build Out Conditions.
5. *Cumulative Plus Proposed Project Conditions:* Projected traffic forecasts reflecting changes in the Cumulative No Project traffic volumes due to the Proposed Project.

Additional scenarios and/or project alternatives may be requested at the discretion of the Public Works Department, such as:

- Phases of a large, multi-phase project
- Project Alternatives warranted under CEQA guidelines (such as a "reduced project" scenario) to reduce or mitigate project impacts.
- Other scenarios to reflect uncertainty about key No Project conditions, such as the existance of a proposed roadway or development near the Proposed Project.

Forecasts should be developed for daily and peak hour conditions. Typical study hours for the level of service analysis are the average Tuesday through Thursday A.M. peak hour and P.M. peak hour. The AM and PM peak hour should be higheat hour between 7 AM and 9 AM and 4 Pm and 6 PM, respectively, based on traffic count data. Analysis of another hour(s) (i.e. weekend peak hour, Friday P.M. peak hour, project peak hour, etc) may be requested at the discretion of the Public Works Department for unique land uses or project sites.

In general, forecasts and level of service analysis should be prepared for all signalized intersections with 10 or more vehicle trips per lane on one or more intersection approach due to the project. All significant access points to the project site shall be analyzed. Major unsignalized intersections in the project vicinity may also require analysis, including a traffic signal warrant analysis. The Public Works Department shall make the final determination of the intersections to be included in the analysis.

Proposed Project Traffic

"Trip Generation," Institute of Transportation Engineers (ITE), is the primary source for trip generation rates for the TIA. When available, the formulas in this source will be utilized to determine the trips generated by the project. The Public Works Department may approve trip generation rates for similar developments from other sources as well as pass-by trip data for some commercial land uses. Pass-by factors are to be used where deemed appropriate by Public Works to reduce the estimated additional total daily traffic to streets serving a proposed development. They are not to be applied directly to reduce overall trip generation and turning-movement volumes at driveways or intersections serving the proposed development. Appendix E provides a definition of pass-by and non-pas-by trips and how they can be handled in the TIA.

Trip generation, trip distribution, and trip assignment for project trips shall be clearly presented. Daily and peak hour trip generation volumes shall be shown in table format. Trip distribution and trip assignment shall be shown with figures.

Existing Plus Approved Projects Conditions (EPAP)

The Consultant shall obtain a list of relevant approved projects from the Public Works Department for the EPAP Conditions scenario. Trip generation, trip distribution, and trip assignment for approved project trips shall be clearly presented. Daily and peak hour trip generation volumes shall be shown in table format. Trip distribution and trip assignment shall

be shown with figures. Changes in traffic volumes under EPAP Conditions may need to reflect near-term changes in the surrounding roadway system.

Cumulative Conditions

The Consultant shall obtain the City's most recent version of the General Plan Buildout Model to forecast Cumulative Conditions. The land use assumptions in the vicinity of the project should be verified at the Transportation Analysis Zone (TAZ) level by comparing the model assumptions with the project assumptions and other sources (general plan, specific plans, etc.). As needed, the model should be disaggregated in the vicinity of the proposed project to provide sufficient detail to appropriately analyze study area facilities. All model assumptions and modifications should be documented. No modifications other than documented land use or roadway network assumptions should be made to the travel demand model without approval of the Public Works Department.

5. Technical Analysis

Level of Service

A level of service (LOS) analysis shall be conducted for all study intersections identified in consultation with the Public Works Department. At a minimum, levels of service shall be calculated for the AM and PM peak hour on an average Tuesday through Thursday under EPAP and Cumulative conditions with and without the project.

The LOS analysis for signalized and unsignalized intersections should use the latest version for the "Highway Capacity Manual" (HCM), Transportation Research Board (TRB), which bases service levels on average vehicle delay. The LOS analysis, especially for signalized intersections using the HCM operations method, can yield substantially different delay calculations depending on input assumptions. Therefore, the City has established some default assumptions for the LOS analysis (see Appendix D).

Under existing conditions, current signal timing should be used. For EPAP and cumulative conditions, signal timing can be modified to reflect changes in traffic volumes or signal phasing. Modified signal timing can be based on optimized "splits" (except were directed by the City Traffic Engineer) but shall not exceed maximum cycle lengths.

The various LOS analysis software using HCM methods and their optimizing routines can provide somewhat different estimates of delay and LOS. This is due to the complexity and detail required in the calculation and the slightly different interpretations of the HCM method among available analysis software. Therefore, the City has chosen to standardize the LOS analysis software for TIAs and directs that the latest version of TRAFFIX (Dowling Associates) shall be used. The reasons this software was selected are:

- TRAFFIX can calculate the LOS for signalized intersection using 2000 Highway Capacity Manual (HCM) operations method including "optimal" signal timing (green

times and cycle lengths) and maximum queue lengths to assist in evaluating signalized intersection operations.

- TRAFFIX can calculate the intersection level of service for yield, two-way stop, and all-way stop controlled intersections according to the 2000 HCM methods.
- This software has kept pace with updates to the HCM.
- TRAFFIX allows the "batch processing" of numerous intersections at one time.
- TRAFFIX contains a traffic forecasting module for traffic impact studies that stores and utilizes assumptions for trip generation, trip distribution and assignment "paths" on a schematic network.

All parameters used in LOS analysis must be provided in the appendix of the TIA by providing the detailed LOS output reports from TRAFFIX. The latest version of TRAFFIX should be used. The following TRAFFIX reports should be included: "Level of Service Summary Report," "LOS Base Compute Report," and "LOS Base Detail Report." If zones were selected to generate trips, the appendix should also include: "Trip Generation Report," "Trip Distribution Report," "LOS Future Compute," and "LOS Future Detail Report." The "Signal Warrant Report" should also be provided if unsignalized inters4ections are analyzed to determine whether or not they meet peak hour signal warrants.

Under conditions where a LOS analysis needs additional detail to incorporate the efforts of coordination on a signal system, the Synchro HCM delay calculation may be used with approval of the Public Works Department.

Roundabout analysis (if needed) shall use the FHWA Method (available in Traffix).

Queuing

The evaluation of study area intersections and driveways shall also include an analysis of queue spillbacks and capacity of turning movement storage bays. The analysis shall include the effect of queue spillback onto other movements and upstream intersections. The back of queue shall be determined at the 95% confidence level.

Signal Warrants

The TIA should determine whether or not any unsignalized intersections near the project site would meet signal warrants under existing or buildout conditions with or without the project. At a minimum, peak hour signal warrants shall be evaluated.

Traffic Share Analysis

For any identified mitigation measure (beyond improvements fully covered by the City's traffic impact fees or funded fully by other sources), the project's share of the total traffic flowing through that improvement shall be calculated. The percentage of project traffic using a facility shall be based on the total PM peak hour volumes under Cumulative (City Buildout) Conditions. For roadway widenings (i.e. from two lanes to four lanes), the percentage share should be based on the two-way directional peak hour volume on that segment of roadway. If

the mitigation measure is an additional right-turn or left-turn lane at an intersection, the percentage share should be based solely on the volume using that additional lane during the PM peak hour. The Public Works Department shall be consulted about methods used to estimate a project's share of unusual improvements. A table detailing the traffic proportion share calculations should be included in the TIA report.

Schools

For any proposed project that contains a school site, even if that school will be developed by others, the TIA shall include an analysis of parking and drop-off/pick-up circulation at the site to ensure that the site, once developed, can adequately accommodate school traffic circulation. This school site analysis shall be coordinated with the associated public or private school district.

Transit

The TIA will discuss all bus routes or other transit opportunities that have, or will have a station or stop within 1/4 mile of the project. The TIA shall evaluate and discuss any potential adverse impacts to transit circulation or service due to the Proposed Project.

Bicycles

The TIA should identify any existing or planned bikeway facilities that are within 1/4 mile of the project and shall identify those that would be modified or adversely impacted by the project.

Pedestrians

The TIA shall identify any significant pedestrian facilities (sidewalks, crosswalks, pathways, trails, etc.) that will be affected by the project.

Trucks

For industrial projects, the TIA shall identify the number of truck trips that will be generated and identify accommodations necessary to support these trucks.

Parking

For retail, office, recreational/entertainment and institutional projects, parking demand shall be calculated for a design day.

Traffic Calming

The TIA shall identify opportunities for traffic calming features based on the City's Traffic Calming Guidelines (adoption anticipated late-2003).

Access Management

The TIA will determine if the proposed driveway spacing and location, as well as mitigation necessary for new accesses/driveways, meet the access provisions being established within the new Development Code (adoption anticipated late-2003).

Sight Distance

For any proposed driveway or local roadway intersection where the potential for inadequate sight distance is identified, an evaluation of the available sight distance shall be conducted based on field measurements and Caltrans' Highway Design Manual.

Park & Ride

The TIA shall identify the amount of park-and-ride demand generated by the proposed project. This estimated demand will be used to determine the project's share of city-wide demand for new park-and ride facilities.

Compliance with Policies

The TIA shall determine if the project is in compliance with City plans and policies including Specific Plan (Precise Plan) provisions (i.e. right-of-way and lane width, access provisions/restrictions and associated analysis).

6. Standards of Significance for Transportation System

The following standards and criteria shall be used in the TIA to determine if a project has a significant impact. These criteria may be modified or expanded for unique project circumstances or to reflect policies adopted by the City at the discretion of the Public Works Department.

City of Stockton Intersections

The City of Stockton's General Plan has a LOS "D" standard for its roadway system. Intersections and roadway segments operating at LOS "A", "B", "C", or "D" conditions are consisdered acceptable, while those operating at LOS "E" or "F" conditions are consisdered unacceptable.

For a City intersection, a transportation impact for a project is considered significant if the addition of project traffic would cause an intersection that would function at LOS "D" or better without the Project to function at LOS "E" or "F".

For City intersections with a LOS "E" or "F" conditions without the project, a transportation impact for a project is considered significant if the addition of project traffic causes an increase of greater than 5 seconds in the average delay for the intersection.

Caltrans Facilities

Facilities under the jurisdiction of Caltrans, including freeway segmants (multi-lane and two lane highways), ramps, ramp terminals, signalized intersections, unsignalized intersections and urban streets, shall utilize the current Caltrans standard to determine project traffic impact.

Transit

A significant impact to the transit system would occur where project generated ridership, when added to existing or future ridership, exceeds available or planned system capacity. Capacity is defined as the total number of passengers the system of busses and light rail vehicles can carry during the peak hours of operation.

Bikeways

A significant bikeway impact would occur if the project hindered or eliminated an existing designated bikeway, or if the project interfered with implementation of a proposed bikeway.

A significant bikeway impact could occur if the project were to result in unsafe conditions for bicyclists, including unsafe bicycle/pedestrian or bicycle/motor vehicle conflicts.

Pedestrian Circulation

A significant pedestrian circulation impact would occur if the project were to result in unsafe conditions for pedestrians, including unsafe increases in pedestrian / bicycle or pedestrian / motor vehicle conflicts.

Local Vehicular Circulation

A significant impact to the local pedestrian, bicycle, automobile, and/or transit circulation would occur if the normal operations of automobile and truck access to the project site would adversely impact adjacent streets or sidewalks.

Safety

A significant impact to the safety of drivers would occur if there is inadequate sight distance from a project driveway to view approaching vehicles.

7. Mitigation Measures

For every significant impact, the TIA must identify and discuss mitigation measures at a conceptual level that will be implemented by the proposed development. The TIA may identify a mitigation measure or develop a range of mitigation measures for each impact to improve the performance of the transportation system. Mitigation measures shall be specific and feasible actions that will actually improve adverse transportation conditions. The mitigation measures shall improve conditions or correct capacity deficiencies to acceptable levels of service. The TIA should discuss whether the measure reduces the impact to a less-than-significant level, and should report the conditions after the implementation of the mitigation measure.

An effective mitigation measure shall adequately avoid, minimize, rectify, or compensate an impact. It shall be consistent with local plans and policies. If the mitigation measures do not reduce impacts to less than significant, an environmental impact report is required.

Mitigation measures may include traffic control devices, roadway design features and parking control devices. The Consultant shall determine the need for new traffic control devices, parking control programs/devices, and roadway design features (including traffic calming measures) based on the City's traffic engineering policies and procedures and Caltrans' "Traffic Manual". The installation of traffic control devices and parking control devices and construction of roadway design features shall conform to engineering standards and traffic engineering rules and regulations.

In addition, mitigation measures shall address vehicular queues, progression quality, and other factors that affect traffic conditions that are not part of the LOS analyses. They shall consider traffic operations at intersections, driveways, interchanges, and ramp meters.

For mitigation measures, the TIA must discuss any improvements and programs (objectives and specifics) needed to reduce a project impact plus the implementation schedule for these measures. The implementation schedule shall match the proposed mitigation measures with an easily identifyable milestone of project completion.

The City has developed a traffic impact fee program to fund certain transportation system improvements. This fee program does not necessarily eliminate the need for a TIA or implementation of mitigation measures by the project applicant.

8. Documentation

For consistency, the TIA report shall follow the City's format (See Appendix C). The Public Works Department and Community Development Department staff will review and comment on the draft TIA report. The Consultant shall make the necessary revisions and submit the final TIA report to the Public Works Department for approval. The Consultant shall furnish copies of the draft and final TIA report to the City.

The report shall meet the following requirements:

1. The report shall clearly state its purpose and objectives.
2. The report shall be presented in a clear and logical sequence. It shall lead the reader step-by-step through the various stages of the process and to the resulting conclusions and recommendations. It shall include graphics, tables and charts to clearly identify the project, the project location, proposed project phasing, impacts, issues and solutions. Purely technical data (i.e. turning movement counts, LOS calculations, etc.) shall be included in appendices with a summary within the body of the report.
3. All maps and graphics involving mitigation improvements must be drawn to scale with roadway geometrics appropriately dimensioned (e.g. road width, lane width, 95% confidence level queue length etc.). The intent of such graphics is to assist in determining the feasibility of a proposed mitigation. Therefore, graphic must include adajcent structures/uses, parking areas, bus stops, pedestrian crosswalks, driveways, etc.

4. All computerized analysis output sheets and supporting raw-count data (hose counts and intersection turning movement) and intersection delay/LOS calulations shall be submitted as an appendix to the draft report for review. All assumptions used in the calculations must be referred to the appropriate table, chart or page in approved publication. Calculations must be comprehensive and clear.
5. The TIA shall identify traffic congestion, safety problems and/or other deficiencies of the existing and future transportation system (for vehicle, transit, bicycle and pedestrian travel), with and without the proposed development, including identified transportation improvements being planned by other public or private organizations that are expected to be in operation by the future years under study.
6. Where build-out roadway and intersection configurations are different from those currently existing, they must be based on approved projects as determined by the Public Works Department.
7. Description of on-site issues including number and location of driveways, parking needs, parking layout, circulation, bicycle and pedestrian facilities, truck access and operations, transit and safety shall be presented.
8. The report shall cover the potential measures needed to mitigate the impact of the Proposed Project to the level defined by local and state policies. The "Standards of Significance" listed in these TIA Guidelines may need to be supplemented to reflect unique issues or policies.
9. The TIA shall contain recommendations for site access and transportation improvements needed to maintain traffic flow to, from, within, and past the site at an acceptable and safe level of service. Improvements typically include roadway widening, additional turn lanes, traffic signal installations and modifications, bicycle, pedestrian and transit amenities, and safety measures.
10. Description of coordination efforts with other affected jurisdictions impacted by the development shall be included.
11. The Consultant shall provide the City with all relavant electronic files used to forecast traffic with the City's travel demand model.
12. The cover page of the traffic study is required to be stamped and signed by a Professional Engineer (Traffic or Civil).

CITY OF STOCKTON
TRANSPORTATION IMPACT ANALYSIS
GUIDELINES

APPENDICES

APPENDIX A
TIA: INITIAL ASSESSMENT (FORM 1)

SECTION 1: PROJECT AND APPLICANT INFORMATION *(TO BE COMPLETED BY APPLICANT)*

PROJECT TITLE	PROJECT LOCATION	APPLICATION NO.
APPLICANT	APPLICANT CONTACT	APPLICANT PHONE

SECTION 2: APPLICATION TYPE AND PROJECT DESCRIPTION (TO BE COMPLETED BY APPLICANT)

TYPE OF APPLICATION	(check)		(check)
ZONING		AMENDMENT TO DEVELOPMENT APPROVAL	
TENTATIVE MAP		NEW DEVELOPMENT / CONSTRUCTION	
USE PERMIT		OTHER:	

PROJECT DESCRIPTION

PROPOSED LAND USE	(check)	Answer the corresponding question regarding the proposed project:	**Yes**	**No**
RESIDENTIAL		Is the proposed residential project greater than 100 dwelling units?		
COMMERCIAL		Is the proposed commercial project building larger than 1,500 sq. ft.?		
		Does the proposed commercial project have a fast-food restaurant?		
OFFICE		Is the proposed office project building larger than 15,000 sq. ft.?		
INDUSTRIAL		Is the proposed industrial project building larger than 20,000 sq. ft.?		
OTHER: (please describe)				

TRAFFIC GENERATION (AVERAGE WEEKDAY)

ITE Land Use Code	**Size**	**Unit Name (e.g. sq ft, apts)**

Total Vehicle trips	_____	Vehicle trips per day		
Peak Hour Trips		A.M. Peak Hour		P.M. Peak Hour
* New vehicle trips	_____	Vehicle trips per hour	_____	Vehicle trips per hour
* Pass-by vehicle trips	_____	Vehicle trips per hour	_____	Vehicle trips per hour
* Total vehicle trips	_____	Vehicle trips per hour	_____	Vehicle trips per hour
Total trips IN	_____	Vehicle trips per hour	_____	Vehicle trips per hour
Total trips OUT	_____	Vehicle trips per hour	_____	Vehicle trips per hour

Submitted by

_____ _____

Signature of Applicant Date

REMAINING SECTIONS TO BE COMPLETED BY CITY

SECTION 3: TRANSPORTATION IMPACT EVALUATION

Transportation / Circulation Could the proposed project:	NO	MAYBE	YES
Cause a substantial increase in traffic (100 peak hour trips) in relation to the existing traffic load and capacity of the street system?			
Cause any public or private street intersection to function below level of service specified in the City of Stockton General Plan?			
Pose a potential vehicle safety hazard (i.e. unsafe sight distance, etc.)			
Pose a potential traffic hazard to pedestrians or bicyclists?			
Adversely affect vehicle, bicycle or pedestrian access to surrounding uses?			

SECTION 4: DETERMINATION

On the basis of this initial assessment for significance:

I have determined that a Transportation Impact Analysis on the proposed project ___WILL NOT BE required.

I have determined that a Transportation Impact Analysis on the proposed project ___WILL BE required as part of an environmental document.

_____ _____

Public Works Department Date

APPENDIX B
TIA: GENERAL SCOPE OF WORK (Form 2)

PROJECT TITLE	PROJECT LOCATION	APPLICATION NO.
APPLICANT	TRAFFIC CONSULTANT	CITY DEPARTMENT
APPLICANT CONTACT	CONSULTANT CONTACT	CITY CONTACT
APPLICANT PHONE	CONSULTANT PHONE	CITY PHONE
APPLICANT E-MAIL	CONSULTANT E-MAIL	CITY E-MAIL

ANALYSIS AREA BOUNDARIES	NORTH	SOUTH
	EAST	WEST

KEY TRANSPORTATION SYSTEM IMPROVEMENTS	
EXISTING PLUS APPROVED PROJECT CONDITIONS	
CUMULATIVE CONDITIONS	

TRANSPORTATION SYSTEM IMPROVEMENTS		
ITEMS FOR ANALYSIS	*(check)*	*Comments/Locations*
QUEUE SPILLBACKS		
ACCESS MANAGEMENT (INCLUDES DRIVEWAYS)		
TRANSIT/ BICYCLE/ PEDESTRIAN ACCESS		
SITE CIRCULATION AND PARKING		
NEIGHBORHOOD TRAFFIC & PARKING MANAGEMENT		
TRAFFIC SAFETY		
PUBLIC SCHOOLS		
OTHER		

TIA: General Scope of Work (Form 2 cont'd)

ANALYSIS SCENARIOS

- ❑ EXISTING CONDITIONS
- ❑ EXISTING PLUS APPROVED PROJECT (EPAP) CONDITIONS
- ❑ EPAP WITH PROJECT CONDITIONS
- ❑ CUMULATIVE (GENERAL PLAN BUILDOUT) NO PROJECT CONDITIONS
- ❑ CUMULATIVE WITH PROJECT CONDITIONS
- ❑ OTHER _____

- ❑ PROJECT ALTERNATIVES:

_____

_____

_____

ANALYSIS PERIODS

- ❑ A.M. PEAK HOUR
- ❑ P.M. PEAK HOUR
- ❑ OTHER _____

ANALYSIS LOCATIONS

INTERSECTIONS	ARTERIAL and FREEWAY SEGMENTS

APPENDIX C
TIA: REPORT FORMAT AND CONTENTS

I. PROJECT DESCRIPTION
- a. Location & Map
- b. Square footage by use (i.e. office, retail, residential, etc.), staging
- c. Site Plan showing, if available:
    1. Auto, transit, pedestrian, service access
    2. Parking facilities (number of spaces, dimensions, circulation)
    3. Any proposed sidewalk improvements

II. EXISTING CONDITIONS (in vicinity of the project)
- a. Street System
    1. Number of lanes and any transit/bike lanes on major streets & access streets
    2. Traffic volumes on major streets
    3. Peak hour level of service at critical intersections
- b. Other Travel Modes
    1. Bicycle facilities (routes, lanes), if any near project site
    2. Transit service, if any near project site
    3. Pedestrian facilities, if any near project site
- c. Miscellaneous
    1. Curbside truck loading zones on project block, if any near project site
    2. Railroad crossings, if any near project site
    3. Any other issues

III. IMPACT ANALYSIS
- a. Method of Analysis
    1. Overview of analysis
    2. Scenarios and alternatives evaluated
    3. Standards of significance
- b. Trip Generation and Distribution of Project
    1. Average daily traffic and PM peak hour trip generation
    2. Geographic distribution by percent
- c. Existing Plus Approved Project (EPAP) Conditions
    1. Trip generation of approved projects and baseline growth
    2. traffic volumes and LOS
- d. Project Traffic Impacts under EPAP Conditions
    1. Traffic volumes with project
    2. Peak hour level of service at critical intersections
    3. Critical corridor analysis including ramp termini capacities
    4. Delay/signal warrants and LOS/other controls at critical unsignalized intersections
    5. Parking impacts
    6. Pedestrian flows/LOS for critical crosswalks and/or sidewalk areas

7. Delays/changes at existing RR crossings
8. Emergency vehicles access
9. Service vehicle impacts (maneuvering/docking and curbside loading zone impacts)

e. Cumulative No Project Conditions
   1. Build out land use and roadway system assumptions
   2. Overview of Citywide Travel Demand Model
   3. Traffic volumes under build out conditions
   4. LOS under build out conditions

f. Project Traffic Impacts under Cumulative Conditions
   1. Traffic volumes with project
   2. Peak hour level of service at critical intersections
   3. Critical corridor analysis including ramp termini capacities
   4. Delay/signal warrants and LOS/other controls at critical non-signalized intersections
   5. Delays/changes at existing RR crossings

g. Transportation Impacts of Construction, if any
   1. Street/sidewalk closures
   2. Circulation Impacts
   3. Parking Impacts

h. Policy Implications
   1. Consistency of Project with City Plans/Policy

IV. ALTERNATIVES

a. Traffic/parking impacts of selected alternatives to proposed project

V. MITIGATION MEASURES

a. Propose/suggested measures for mitigating adverse transportation impacts of project. Levels of service and other appropriate parameters to be estimated, where applicable, for each mitigation measure.

APPENDIX D
TIA: DEFAULT ASSUMPTIONS FOR LEVEL OF SERVICE ANALYSIS

Peak Periods

- Weekday peak periods in the City are:
  - 7:00 A.M. to 9:00 A.M. for A.M. peak period
  - 4:00 P.M. to 6:00 P.M. for P.M. peak period

HCM Parameters for LOS Analysis in Stockton

Default TRAFFIX values and assumptions should generally be used, with adjustments, as appropriate to reflect local conditions.

- METHOD: 2000 HCM Operations Method for signalized and unsignalized intersections
- Design Queue method - select as default.
  Clearance Time is 5 seconds. (4 seconds permitted for through movements.)
- LOSS TIME: Based upon assumed number of phases and signal control
- Maximum Cycle Lengths: The City of Stockton currently has no standard for maximum cycle lengths. Most signals run cycle lengths of 130 seconds or less.
- Minimum green times should accommodate pedestrian timings at 4.0 feet per second at fixed time signals without pedestrian signal buttons (at some downtown locations)
- Grades in Stockton are generally considered to be 0%
- Area Type: Use Other or CBD, as appropriate. Downtown Stockton, bounded by A, B, C and D Streets, should use the "CBD Area Type"
- Arrival type main street: 4
- Arrival type side street: 4
- Calc HCM Sat Adj: Yes (except where warning errors suggested it be turned off, in oversaturated conditions)
- Coordinated Systems: Study intersections on the following streets should be checked prior to analysis, as they may be coordinated with other signals: March Lane, Pacific Avenue, Hammer Lane, Pershing Avenue, El Dorado Street, Airport Way, and Wilson Way.
- Unsignalized Intersections: Report average overall intersection delay. Determine impacts based upon added seconds delay to overall intersection (not worst case movement).

APPENDIX E
PASS-BY AND NON-PASS-BY TRIPS IN TRIP GENERATION ANALYSIS

The ITE has developed a recommended practice to establish a basis for consistency in traffic impact studies, with the primary purpose of providing reliable guidance for site access, on-site circulation, and off-site improvement planning in accommodating site and other traffic safely and efficiently. [1] The sections that follow have been extracted from the industry-standard reference *Trip Generation Handbook, An ITE Recommended Practice*.

The trip generation rates and equations contained in ITE's *Trip Generation* represent vehicles entering and exiting a site at its driveways. These volumes are appropriate for determining the total traffic to be accommodated by the project site's driveways. There are land use types, however, for which the total number of trips generated by the site is different from the amount of new traffic added to the street system by the proposed project. Certain land uses, e.g. retail, restaurants, banks, among others, attract motorists already on the street. These sites attract a portion of their trips from traffic passing the site on the way from an origin to an ultimate destination. Hence, the impacts of a proposed project on an adjacent street may be less than the full trip estimates using ITE trip generation rates.

Trip-making can be broken down into two major categories: pass-by trips and non-pass-by-trips. In some traffic impact study applications, the subdivision of non-pass-by trips might be appropriate and could be broken into primary trips and diverted linked trips.

1. **Pass-By Trips:** trips that are made as intermediate stops on the way from an origin to a primary trip destination without a route diversion. They are attracted from passing the site on an adjacent street or roadway that offers direct access to the project site. Pass-by trips are not diverted from another roadway. These trips are closely linked to the size of the development and to the volumes of traffic on the adjacent street that can deliver the pass-by trip.

    a. Driveway Improvements. Pass-by trips are drawn from the passing stream, but are always included in the site driveway movements. Summation of driveway volumes must equal the total external site trip generation (i.e., the sum of primary, pass-by, and diverted linked trips).

    b. Adjacent Volumes. Pass-by trips are not included in (and thus, subtracted from) the through-volumes passing a given site access point on an adjacent road. The *Trip Generation Handbook, An ITE Recommended Practice* provides recommended guidelines and data sets useful in selecting a pass-by percentage to appropriately reduce estimated traffic volumes.

---

[1] *Transportation Impact Studies, Advancing the Land Development Process* (Brochure), Institute of Transportation Engineers

c. Multi-Use Development. Before applying the pass-by reduction for multi-use development, the internal trips should be removed from the total number of trips generated by the multi-use site. Pass-by trips are only applicable to trips that enter or exit the site, not internal trips.

2. **Non-Pass-By Trips:** simply all trips generated by a project site that are not pass-by trips. The trip generation estimation for all new or proposed development projects must include the summation of primary trips and diverted linked trips.

a. Primary Trips: trips made for the specific purpose of visiting the generator. The stop at the generator is the primary reason for the trip. The trip typically goes from origin to generator and then returns to the origin, e.g., home-to-shopping-to-home combination of trips.

b. Diverted Linked Trips: trips that are attracted from the traffic volume on roadways within the vicinity of the generator but that require a diversion from that roadway to another roadway to gain access to the site.

i. i). Diverted linked trips add traffic to streets adjacent to a project site, but may not add traffic to the area's major travel routes, such nearby major highways or freeways.

ii. ii). Because diverted linked trips are often difficult to identify, these trips should be treated similarly to primary trips, unless: (1) all three (primary, pass-by, and diverted linked) categories are being analyzed and processed separately, and (2) the travel routes for diverted link trips can be clearly established.

iii. iii). Standard methodologies for assessing traffic impacts of site development typically require that diverted linked trips be included as additional trips within the confines of local impact assessment studies.

iv. Diverted linked trips represent a change in local area travel patterns but constitute no new increase on a macroscopic scale. Within the immediate study area, however, diverted linked trips do represent additional traffic on individual streets and should be analyzed that way.

APPENDIX F
TIA: LIST OF ACRONYMS

ADT	Average Daily Traffic
Caltrans	California Department of Transportation
CEQA	California Environmental Quality Act
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EPAP	Existing plus Approved Projects
HCM	Highway Capacity Manual
HOV	High Occupancy Vehicle
ITE	Institute of Transportation Engineers
LOS	Level of Service
NEPA	National Environmental Policy Act
PNR	Park and Ride
PSR	Project Study Report
RTIP	Regional Transportation Improvement Program
RTP	Regional Transportation Plan
SOV	Single Occupant Vehicle
SRTP	Short Range Transit Plan
STIP	State Transportation Improvement Program
TAZ	Transportation Analysis Zone
TCM	Transportation Control Measure
TCRP	Transportation Congestion Relief Program
TDA	Transportation Development Act
TDM	Transportation Demand Management
TIA	Transportation Impact Analysis
TIP	Transportation Improvement Program
TOS	Traffic Operation System
TRB	Transportation Research Board
TSM	Transportation Systems Management
V/C	Volume/Capacity

APPENDIX G
TIA: REFERENCES

State of California:

- California Vehicle Code
- Traffic Manual
- Highway Design Manual
- Caltrans Guide for the Preparation of Traffic Impact Studies
- Traffic Volumes on State Highways

City of Stockton:

- Municipal Code
- General Plan
- Specific Plans (Roadway and Land Use)
- Street Improvement Fee program
- Capital Improvement Program
- Short Range Transit Plan
- Bikeway Plan
- Other Transportation Impact Analyses

City of Stockton



Traffic Calming Guidelines

November 2003

City of Stockton
Public Works Department
Engineering Division
425 N. El Dorado Street
Stockton, CA 95202

Fehr & Peers
Transportation Consultants

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I. INTRODUCTION

Purpose

The City of Stockton is developing a Neighborhood Traffic Management Program (NTMP) to address concerns about safety, noise and quality of life issues related to vehicle traffic on neighborhood streets. The NTMP will include a formal process for the implementation of traffic calming measures in Stockton neighborhoods and a toolbox of potential traffic calming measures. This document outlines the proposed traffic calming program and is supported by two related documents:

- Street Design Guidelines, which include revisions to Stockton's street development standards to include narrower street widths, landscape strips separating the curb from the sidewalk, and requirements for roundabouts and traffic circles in lieu of traffic signals or stop signs at many new intersections as development occurs in Stockton

- Pedestrian Safety and Crosswalk Installation Guidelines, which provide guidance for improving pedestrian safety, circulation, and specific guidelines for the installation of crosswalks

The traffic Calming Guidelines provide a framework for the selection, application, and design of traffic calming measures in the City of Stockton. This document is primarily intended for use by City staff and neighborhood residents when developing traffic calming plans as part of the NTMP. The NTMP is the formal process by which City staff identifies neighborhoods in need of traffic calming and implements a neighborhood specific-traffic calming plan to reduce the severity of the problem at hand. This document will also assist City staff and developers concerned with avoiding traffic problems in new neighborhoods and members of the general public who are interested in finding out how the City of Stockton implements traffic calming plans.

Being guidelines, the contents are not intended as rigid requirements; rather, they are a tool for use by City staff, citizens, and other interested parties to help develop effective traffic calming plans that adequately

accommodate motor vehicles, pedestrians, and bicyclists, while enhancing the neighborhood environment.

The guidelines provide a process for City staff and community members to identify various traffic calming problems experienced in existing neighborhoods (i.e. high speeds, volumes, and cut-through traffic) and to develop effective solutions. A "toolbox" of traffic calming measures describes each device and the type of problem that it is effective at treating. The toolbox also contains pictures of past installations, design considerations that may apply to your preferred traffic calming solutions, and design standards.

City Staff and developers can reduce the need for future traffic calming by designing new streets that discourage speeding and cut-through traffic. Streets should be designed to provide adequate travel lanes and parking yet avoid excessive widths. Shorter blocks reduce the ability of drivers to reach and maintain high speeds. To supplement these good design practices, traffic calming measures can also be installed as part of the initial development.

Goals & Objectives

The goal and objectives of this document are patterned after the NTMP. The driving goal of the NTMP is:

> To improve the quality-of-life for residents by reducing the safety and nuisance impacts from: speeding vehicles, cut-thru traffic, and careless drivers.

The NTMP strives to meet this goal through the implementation of self-enforcing mechanisms that result in:

- 85th percentile travel speeds within 5 mph of the appropriate speed limit for residential and collector streets
- Reduced numbers and/or reduced severity of reported collisions
- Reduced cut-through traffic where existing levels are significant and where the remedy will not create a problem on other streets

- A better environment for residents and business owners as indicated by their sense of safety, property values, comfort in using the street, and reduced traffic-related complaints

These objectives will be met through effective engineering principles applied to the development of traffic calming strategies that address community-identified traffic issues. Residents will be educated with information and tools necessary to become active participants in addressing their neighborhood traffic concerns. Targeted police enforcement will support the traffic calming plan developed by residents and the City Traffic Engineer.

The traffic calming measures proposed in this document are intended for use on all two-lane local residential, local commercial and collector streets to "calm" traffic in and around neighborhoods. Speed management on arterials can be accomplished through non-physical measures (such as signal timing) rather than physical devices that reduce roadway capacity.

The role of the guidelines in supporting the goal and objectives above is to articulate the method by which tools and strategies are considered and selected for use in meeting those goals and objectives.

ADVISORY PANEL MEMBERS:

- Jim Giottonini, City of Stockton Public Works Department
- Todd Greenwood, City of Stockton Public Works Department
- Nate Knodt, San Joaquin Regional Transit District
- Victor Machado, City of Stockton Parks & Recreation
- Gregg Meissner, City of Stockton Public Works Department
- Michael Morrell, City of Stockton Fire Department
- Barry O' Regan, City of Stockton Public Works Department
- Dianne Smith, City of Stockton Planning Department
- Gary Tsutsumi, City of Stockton Public Works Department
- Tom Wells, City of Stockton Police Department
- Kari Wilson, San Joaquin Regional Transit District

How the Guidelines Were Developed

The contents of the guidelines were developed with the assistance of an advisory panel, composed of City staff and other local agencies. The advisory panel was convened on January 24, 2003, for a workshop designed to gather input on the traffic calming guidelines.

The workshop also included a tutorial on traffic calming, focusing on the types of measures available including engineering and aesthetic issues. The panel actively discussed traffic calming measures and aesthetic options. Through this discussion, the panel reached a

consensus that defined the range of acceptable roadway characteristics on which selected measures, designs, and aesthetics would be applicable.

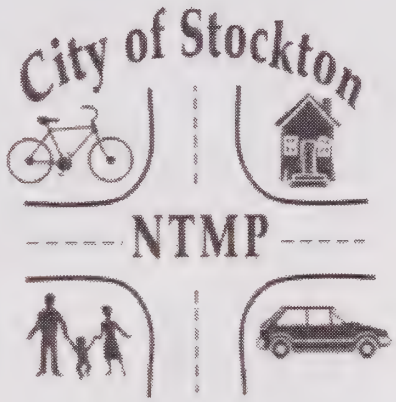
For More Information

The guidelines draw extensively from the approved *City of Sacramento Traffic Calming Guidelines*, 2002 and two documents written by Reid Ewing: *Traffic Calming: State of the Practice* (Reid Ewing, FHWA, 1999) and *Delaware Traffic Calming Design Manual* (Reid Ewing, Delaware Department of Transportation, 2000). For more detailed information on the topics addressed in this document, please refer to these reports. A more comprehensive list of resources is listed in Chapter VII.

II. NEIGHBORHOOD TRAFFIC MANAGEMENT PROGRAM (FOR EXISTING NEIGHBORHOODS)

Process for Selecting a Neighborhood

For a neighborhood to be included in the NTMP, a resident must complete the NTMP Request Form which includes questions about the neighborhood boundaries, traffic issues that concern residents in the neighborhood, and a petition. Ten residents at least 18 years of age and from separate households within the neighborhood boundaries described in the NTMP Request Form must sign the petition. The completed form/petition must be submitted to the Public Works Department, Traffic Engineering/NTMP.



The process would begin with an initial sixty-day filing period to provide an equal opportunity for all interested residents to submit their completed form. At the close of the filing period, a lottery would determine the order of applicants. Public Works will continuously accept NTMP Request Forms after the initial filing period and will rank in the order received. Public Works will organize neighborhoods by City of Stockton Police Districts (Lakeview, Seaport, Valley Oak, and combined Civic Center and Park). The goal is to select one neighborhood from each of the four districts annually based on available funding.

Neighborhood boundaries will be established based on information from the NTMP Request Form, a review by Public Works staff to ensure that all affected areas are included, and input from the City Council if necessary. Requests with overlapping boundaries may be consolidated if appropriate. The NTMP process is summarized by the flowchart in Figures A-1 and A-2.

Getting the Process Started

Public Works kicks off the NTMP in each selected area by inviting all residents to learn more about the program at a community meeting. At this meeting, interested residents can volunteer to participate on the Traffic Calming Committee (TCC) for their neighborhood. Although all

residents provide input and receive updates as the plan develops, the TCC is more actively involved, committing the time and effort necessary to develop a comprehensive plan.

Timeframe

Depending on the issues and level of community involvement, it could take one to two years to develop and implement a traffic calming plan.

Traffic Calming Plan: Phase I

All neighborhoods begin by developing a traffic calming plan aimed at changing driver behavior through three types of Phase 1 traffic calming measures:

- Non-physical measures – include reducing obstructions that limit driver visibility, signage, and striping improvements
- Narrowing measures – include bulbouts, chokers, and center island narrowings
- Horizontal measures - include traffic circles, roundabouts, and chicanes

These three types of measures are coupled with police enforcement and educational outreach for a comprehensive approach to traffic calming.

Phase 1 Non-Physical Measures (i.e. visibility, signage and striping improvements, etc.) do not require the same level of community consensus as the implementation of physical measures. Therefore, Non-Physical Measures (see Table 1) may be installed with a request from the TCC and approval by the City Traffic Engineer.

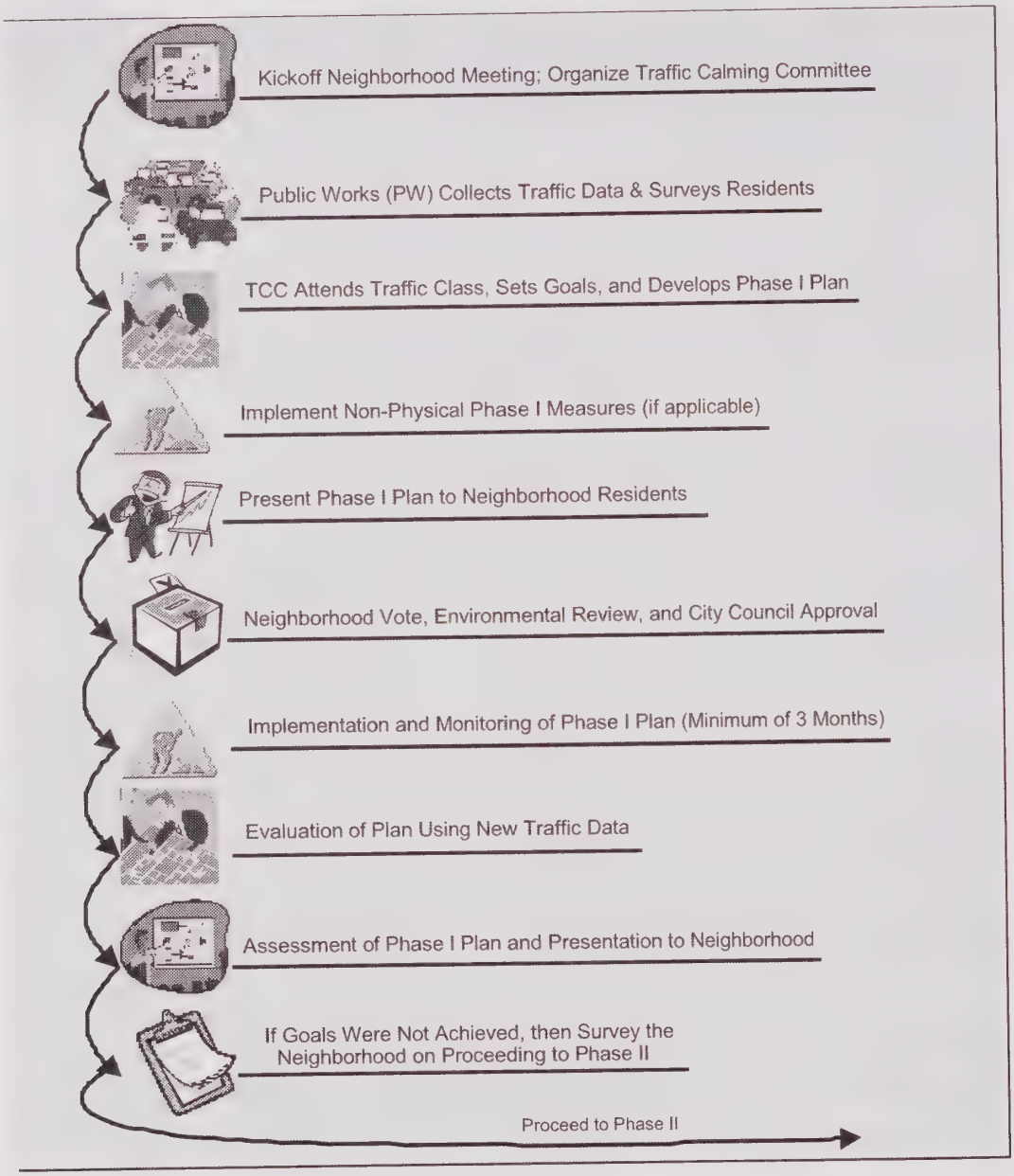


Figure A-1. NTMP Process Flowchart: Phase I

Developing the Plan

The TCC and Public Works hold regular meetings to

- Organize neighborhood outreach
- Identify specific traffic concerns

- Establish goals for calming neighborhood traffic
- Target potential measures
- Consider transit needs if applicable
- Develop a traffic calming plan
- Present the plan to the neighborhood at a community meeting
- Refine the plan based upon community input

Two-Step Voting Process

Step 1. All neighborhood residents and businesses have the opportunity to vote whether a Phase I plan containing more restrictive measures (narrowing, horizontal, etc.) will be implemented. To proceed, a minimum of 25 percent of all ballots must be returned with a simple majority in favor of the plan. Every household and business is allowed one vote.

Step 2. If the community supports the plan through the vote, an environmental review is completed. The plan is then presented to the City Council for final approval and funding.

Putting the Plan into Action

Once the Phase I plan is implemented, a monitoring period of three to six months begins. The City Traffic Engineer and TCC may elect to implement Phase 1 measures using temporary or permanent materials.

Evaluating Phase I

After the monitoring period, the City Traffic Engineer evaluates the effectiveness of the traffic calming plan and presents the results to the TCC. If Phase I has met the TCC's goals, a final report is then provided to neighborhood residents. If the TCC's goals have not been met, they are asked whether to refine the Phase I plan or to move into Phase II of the program. Before Phase II can be considered, $33^{1/3}$ percent of all residents and property owners must vote in favor with a simple majority to proceed.

Traffic Calming Plan: Phase II

If Phase II is determined necessary, the process continues by developing a Traffic Calming Plan that diverts traffic using measures such as diagonal diverters, half or full street closures, and changes in one-way or two-way traffic operations.

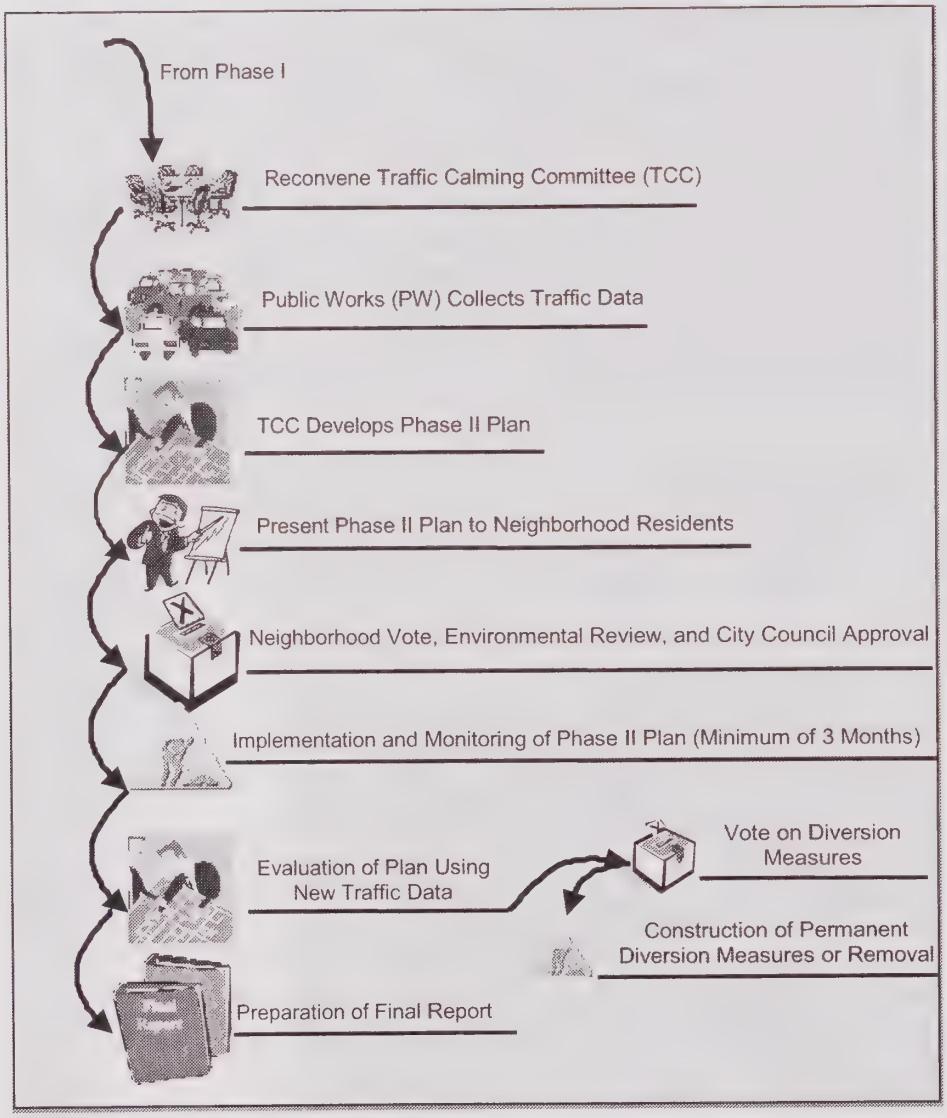


Figure A-2. NTMP Process Flowchart: Phase 2

Revising the Plan

Residents will reestablish the TCC and meet with Public Works to:

- Organize neighborhood outreach
- Target remaining traffic concerns
- Analyze potential Phase II measures
- Consider transit needs if applicable
- Revise the traffic calming plan
- Present the revised plan to the neighborhood

Two-Step Voting Process

Because Phase II devices are designed to explicitly divert traffic, thereby altering access to property, the Phase II plan has a more stringent requirement for neighborhood approval than the Phase I plan. All neighborhood residents, businesses, and property owners (one per address, apartment unit, business, or property owner with the neighborhood who is a non-resident) have an opportunity to vote whether a Phase II plan will be implemented. To proceed, a minimum of 50 percent of all ballots must be returned and 66 2/3 percent of those received must be in favor of the plan.

If supported by the vote, the plan must then be approved by the City Council.

Putting the Plan into Action

Similar to Phase 1, Phase II measures can be implemented using permanent or temporary traffic calming measures. If temporary measures are selected, they should be installed and monitored for a period of three to six months.

Evaluating Phase II

After the monitoring period, the City Traffic Engineer evaluates the effectiveness of the traffic calming plan and presents the results to the TCC. A final report that evaluates Phase II is provided to the neighborhood. The community is then asked to vote on whether the device(s) will remain or be removed.

III. EXISTING NEIGHBORHOOD IMPLEMENTATION

This chapter addresses how to select a traffic calming device in an existing neighborhood. Typically, this process will occur as a part of the larger NTMP. By clearly identifying traffic problems, setting goals and objectives, and selecting appropriate traffic calming measures to meet those goals and objectives, a TCC can develop a traffic calming plan that has a greater likelihood of being approved and of meeting its goals. Figure 1 summarizes the steps that should be taken in the plan development process.



Figure 1. Plan Development Flowchart

1. Characterizing the Problem and Its Environment

The first step in developing a traffic calming plan is to characterize the problem type and to gather information about other conditions present at the problem location. This is accomplished through three tasks:

- Gathering neighborhood input on problems and priorities
- Characterizing problem details
- Collecting quantitative data and characterizing physical and environmental conditions

Neighborhood Input

Resident input must be used to determine whether the primary concern is one of vehicle safety, pedestrian safety, congestion, noise, inconvenience, or something else entirely. If speeding is raised as the main issue, it is important to determine whether the noise factor, the safety factor, or some other concern is paramount. If cut-through traffic is a concern, it is important to know why the traffic is problematic: does it travel too fast, or is there simply such a high volume that it bogs down traffic flow through the neighborhood? If safety is the main concern, then what seems to be the cause: high speeds, cut-corners, or a particularly dangerous conflict location? In many cases, a problem that initially looks like a speeding problem may be a safety problem, or one that initially looks like a volume problem may be a speeding problem.

Characterizing Problem Details

When the primary problem type is determined, the details of the problem need to be characterized: exactly where does it occur, and at what times of day and days of week? Is there a traffic control device (such as all-way stop control at an intersection) that does not seem to work?

Collecting Data

Knowing the exact nature of the problem, the next step is to collect relevant information about the problem and its environment. See the sidebar "Types of Traffic Data" for some examples.

TYPES OF TRAFFIC DATA:

- **Roadway Geometry:** Street widths, block lengths, and locations of stop signs and traffic signals.
- **Roadway Users:** Traffic volumes during peak hours, the entire day, and any particular periods when the problem occurs; pedestrian and bicycle volumes; truck volumes; bus routes; designation as a primary emergency response route; and origin-destination studies.
- **Vehicle Performance Data:** travel speeds, stop sign violations, rates of unsafe driving practices (e.g. cutting corners or crossing the centerline), and collision records.

2. Setting Goals and Objectives

Before selecting traffic calming devices, the TCC should have some idea of their desired outcome. Goals should also be stated to express in qualitative terms, the kind of neighborhood the TCC members desire. Quantitative objectives should be set for each traffic problem to help assess the success of the traffic calming plan in solving the problems. There are no common or regulatory standards for setting these objectives. Consequently, the

objectives should be seen simply as rough yardsticks of success in reviewing the installed plan.

3. Selecting Measures

The first task in developing solutions to the traffic problems is to narrow the toolbox of traffic calming measures to those that will most closely target the key traffic issue, those that are appropriate for the type of location concerned, and those that are compatible with the traffic volumes, geometrics, and adjacent land uses at that location. When the list has been narrowed, devices should be considered that balance effectiveness and likelihood of acceptance. Finally, the selected devices need to be placed in a manner that will produce the desired results.

Selecting Measures for the Problem Type

The first task when selecting the most appropriate traffic calming device is to narrow the field of devices to those that address the primary traffic problem. The major types of problems that result in a desire for traffic calming are:

- **Speeding** – motor vehicle speeds are too high
- **Traffic Volumes** – motor vehicle usage levels (all trips or non-local trips only) are too high
- **Vehicle Safety** – motor vehicles have an inordinate level of risk
- **Pedestrian Safety** – motor vehicles cause an unnecessary risk to pedestrians
- **Noise/Vibration/Air Pollution** – motor vehicles cause excessive levels of these environmental effects

Each device in the toolbox is appropriate to a different subset of the above problem types. The appropriateness of each device is summarized in Table 1 (page 15).

Selecting Measures for the Location Type

Identification of appropriate traffic calming measures should start by determining which measures are applicable to the location of the problem. If the traffic problem is confined to a specific roadway segment, then only measures applicable to roadway segments can be considered. Some other measures can be considered at intersections. Furthermore, certain types of devices are appropriate in residential areas but not in non-residential areas. Table 2 (page 16) indicates the location(s) where each traffic calming measure is applicable.

Selecting Measures for the Street Environment

The last step in narrowing the field of devices requires finding which devices are compatible with the traffic volumes, posted speeds, and special roadway users at the proposed location. For example, many devices have an upper boundary of traffic volumes beyond which any greater volume could result in traffic congestion that might be perceived as worse than the original traffic problem.

Also, since most devices cause some delay for emergency vehicles and transit buses, only certain devices can be used on primary emergency response routes and transit routes. Some measures have additional restrictions, such as hills, curves and bicycle routes that must be considered.

Table 3 (page 18) summarizes the constraints on the use of traffic calming devices in these various environments.

Table 1 – Traffic Calming Measures and Problem Types

Types of Measures		Type of Problem				
		Speeding	Traffic Volume	Vehicle Accidents	Pedestrian Safety	Noise
Phase I Non-Physical Measures						
	Targeted Speed Enforcement	●	○	◒	◒	◒
	Radar Trailer	●	○	○	○	◒
	Speed Feedback Signs	●	○	○	○	◒
	Edgeline/Centerline Striping	●	○	○	○	○
	Optical Speed Bars	◒	○	○	○	○
	Speed Limit Signage	●	○	○	○	○
	Speed Legends	●	○	○	○	○
	Truck Restriction Signs	○	◒	○	○	●
	"Cross Traffic Does Not Stop" Signage	○	○	●	◒	○
	Botts Dots/Raised Reflectors	○	○	●	◒	○
	High-Visibility Crosswalks	◒	○	○	●	○
	Angled Parking	●	◒	○	○	○
Phase I Narrowing Measures						
	Bulbouts	●	◒	○	●	○
	Two-Lane Chokers	●	◒	○	○	○
	Center Island Narrowings/ Pedestrian Refuges	●	◒	◒	●	○
Phase I Horizontal Measures						
	Traffic Circles	●	◒	●	◒	○
	Roundabouts (Single-Lane)	◒	◒	●	○	●
	Lateral Shifts	◒	◒	○	○	○
	Chicanes	●	◒	○	○	○
Phase II Measures						
	Full Closures	●	●	○	○	○
	Half Closures	●	●	○	○	○
	Diagonal Diverters	●	●	○	○	○
	Median Barriers	○	●	◒	○	○
	Forced Turn Islands	○	●	◒	○	○

Key: ● = Strongly Appropriate; ◒ = Moderately Appropriate; × = Inappropriate/Counterproductive; ○ = Indifferent

Table 2 – Traffic Calming Measures and Location Types

Types of Measures	Residential			Non-Residential	
	Midblock	Intersection	Boundary of Area	Midblock	Intersection
Phase I Non-Physical Measures					
Targeted Speed Enforcement Radar Trailer Speed Feedback Signs	●	●	●	●	●
Edgeline/Centerline Striping	●	×	×	●	×
Optical Speed Bars	●	×	×	●	×
Speed Limit Signage Speed Legends	●	●	●	●	●
Truck Restriction Signs	×	×	●	×	●
"Cross Traffic Does Not Stop" Signage	×	○	●	×	○
Botts Dots/Raised Reflectors	On Curves	×	×	●	×
High-Visibility Crosswalks	●	Unsignalized Intersections	Unsignalized Intersections	●	Unsignalized Intersections
Angled Parking	●	×	×	●	×
Phase I Narrowing Measures					
Bulbouts	×	●	●	×	●
Two-Lane Chokers	●	×	×	●	×
Center Island Narrowings/ Pedestrian Refuges	●	●	●	●	●
Phase I Horizontal Measures					
Traffic Circles	×	●	○	×	○
Roundabouts (Single-Lane)	×	○	○	×	●
Lateral Shifts Chicanes	●	×	×	●	×
Phase II Measures					
Full Closures	×	●	●	×	×
Half Closures	×	●	●	×	×
Diagonal Diverters	×	●	×	×	×
Median Barriers	×	○	●	×	×
Forced Turn Islands	×	○	●	×	●

Key: × = Seldom or never applicable. ● = Generally applicable.
○ = Not applicable except in some cases.

Phase 1

Non-Physical Measures – Of the Phase I measures (which include all but the Diversion Measures), the first solutions to consider should always be the Non-Physical Measures, such as signs and markings, since these can be most easily removed if unanticipated problems occur.

Narrowing Devices – The next type of traffic calming measure to consider should be Narrowing Measures, such as bulbouts or center

island medians, which are less obtrusive and more aesthetically appealing than some other devices since they can be combined with landscaping.

Horizontal Deflection Devices – Narrowing Devices are followed by Horizontal Deflection Devices, such as chicanes and traffic circles, which are more intrusive but also more effective because they force vehicles to navigate horizontally around physical objects. These can also be combined with landscaping.

Vertical Deflection Devices – The City of Stockton has precluded the use of Vertical Deflection Devices due to their impact on emergency vehicles. Typical vertical deflection devices include speed humps, speed cushions, speed lumps, split devices (split speed humps), raised crosswalks, and raised intersections.

Phase II

Diversion Devices – The structure of the NTMP process stipulates that Phase II measures cannot be considered until Phase I measures have been attempted and have failed to meet the TCC's goals. Consequently, they will generally not be considered simultaneously with the other types of measures. Diversion devices include half or full road closures and forced turn islands.

Table 3 – Traffic Calming Measures and Traffic Constraints

Types of Measures	Roadway Classification			Bus Route	Other Considerations
	Local Streets	Non-Residential Collectors	Residential Collectors		
Phase I Non-Physical Measures[1]					
Targeted Speed Enforcement	ADT < 10,000; Speed Limit ≤ 35 mph			OK	(None)
Radar Trailers					
Speed Feedback Signs					
Edgeline/Centerline Striping					
Optical Speed Bars					
Signage					
Speed Legend					
Center Line or Edge Line Botts Dots					
High Visibility Crosswalk					
Angled Parking	ADT < 4,000; Width ≥ 48 feet; Speed Limit ≤ 30 mph			No	Not used with bike lanes
Phase I Narrowing Measures[1]					
Bulbouts	ADT < 20,000; Speed Limit ≤ 35 mph			OK	On bike routes, design with clear bike accommodations
Two-Lane Chokers	ADT < 20,000; Speed Limit ≤ 35 mph				
Center Island Narrowings/Pedestrian Refuges	No	ADT < 20,000; Speed Limit ≤ 35 mph			
Phase I Horizontal Measures[1]					
Traffic Circles	Daily Entering Volume < 7,500; Speed Limit ≤ 35 mph	May be required at intersections where residential collector streets intersect with local streets		No	Grade ≤ 10%
Roundabouts (Single-Lane)	Daily Entering Volume < 20,000; Speed Limit ≤ 45 mph			Must design inscribed radius to be 100+ feet	Grade ≤ 6%; On bike routes, design with clear bike accommodations
Lateral Shifts	ADT < 10,000; Speed Limit ≤ 35 mph			OK	Grade ≤ 10%
Chicanes	ADT < 5,000; Speed Limit ≤ 35 mph				Grade ≤ 8%

Note: [1] Traffic calming devices are suitable for existing and new streets.

Table 3 (continued) – Traffic Calming Measures and Traffic Constraints

Types of Measures		Roadway Classification		Bus Route	Other Considerations
		Local Streets	Collectors		
Phase II Restrictive Measures [2]					
	Full Closures	ADT < 5,000; > 25% Non-Local Traffic	No	No	(None)
	Half Closures		No	Public Works & SJRTD[3] must review	
	Diagonal Diverters			No	
	Median Barriers	ADT < 5,000; > 25% Non-Local Traffic			
	Forced Turn Islands				
Combined Measures		Subject to Constraints of Component Measures			
Notes:	[2] Only if other measures are deemed unsatisfactory. Not to be used on new streets. [3] San Joaquin Regional Transit District.				

ESTIMATING MIDPOINT SPEEDS

In mathematical terms, the relationship between midpoint speed and spacing of slow points is given by an exponential function:

$85^{th}_{midpoint} = 85^{th}_{slow\ point} + (85^{th}_{street} - 85^{th}_{slow\ point}) * 0.56 * (1 - e^{-0.004 * spacing})$

where,

$85^{th}_{midpoint}$ = resulting 85th percentile speed at midpoint after calming;
$85^{th}_{slow\ point}$ = estimated 85th percentile speed at the slow point after treatment;
85^{th}_{street} = 85th percentile speed of street before treatment;
spacing = distance in feet between two devices.

When placing speed-control measures, the above formula should be used to test proposed spacing to determine whether the estimated midpoint speeds would be acceptable.

4. Placing the Traffic Calming Measures

The last task in laying out a traffic calming plan is to identify the actual locations where devices should be placed. Strategies for location devices differ depending on whether the major issue is speed-control, volume-control, or safety.

Placing Speed-Control Measures

If feasible, traffic calming measures should be spaced in such a way that the following two design speeds are achieved.

- **Slow-Point 85th Percentile Design Speed –** the speed that 85 percent of vehicles are going less than when they are *crossing* a traffic calming device; the target slow-point speed is defined as five mph *below* the posted speed limit

- **Midpoint 85th Percentile Design Speed –** the speed that 85 percent of vehicles are going less than when they are *halfway between two* traffic calming devices

The spacing of traffic calming measures directly affects the Midpoint speeds: the farther apart they are, the higher the Midpoint speed. See the sidebar "Estimating Midpoint Speeds" on page 19 for more information on setting spacing based on Midpoint speeds.

Placing Volume-Control Measures

Traffic calming devices intended to control traffic volumes can be placed either at entrances to a neighborhood or internally to the neighborhood.

Gateway Measures – Volume-control measures placed at entrances or gateways to the neighborhood can be more immediately effective in reducing volumes because non-local traffic is made aware even before entering the neighborhood that passing through is not a desirable option, causing them to choose to take other routes. However, these measures can also cause local traffic to take more circuitous paths than internal measures would.

Internal Measures – When placed internal to a neighborhood, measures have a less direct effect on non-local traffic. First-time attempts to cross the neighborhood will occur more frequently, especially soon after the devices are constructed. However, this type of placement can cause less of an inconvenience to local traffic.

IV. NEW NEIGHBORHOOD IMPLEMENTATION

In addition to existing neighborhoods, new neighborhoods in the planning stage can benefit from neighborhood traffic management. As part of the NTMP, the City has recently developed *Draft Street Design Guidelines* that include revisions to the City's design standards for new streets. A key element of the revisions is the development of narrower local and collector street standards, and shorter block lengths, to slow and disperse traffic.

Traffic problems can often be anticipated and prevented by properly reviewing street and lot plans for a neighborhood and prescribing refinements to the plan or identifying traffic calming measures that can be constructed concurrent with street construction. The process for reviewing new residential subdivisions is as follows:

1. ***Development Services Review –*** Prior to final approval of a street and lot plan, the plan will be reviewed by the City's Development Review Committee (DRC). In this review, staff will identify proposed roadway layout features that are likely to cause traffic problems, such as inducing speeding or cut-through traffic or presenting an unnecessary risk of collisions.

2. ***Traffic Engineering Review –*** The City's Traffic Engineering Section will review the above recommendations. Any discrepancies will be discussed and resolved.

3. ***Plan Revisions –*** Development Services staff will submit the final comments on the street layout to the developer. If the indicated roadway changes are infeasible due to other constraints, then City Development Services will prescribe traffic calming measures based on the guidelines contained in this document. The cost of the traffic calming measures will be borne by the developer.

4. ***SJRTD Review –*** SJRTD will review the plans to determine the need for future bus routes in the new development and placement of bus stops and associated transit amenities (benches or shelters). The cost of bus stop installation and transit amenities will be borne by the developer.

Designing Street Networks

The guidelines below describe some common street design features and their propensity to lead to traffic calming problems such as speeding and cut-through traffic. These guidelines are intended to complement the *Draft Street Design Guidelines*. They should also assist developers in laying out streets in new residential developments and City staff in reviewing them pursuant to the process described above. This chapter is by no means comprehensive on the layout of new residential streets. For detailed information, the following documents are recommended:

- City of Stockton Street Design Guidelines, City of Stockton, 2003
- Residential Street Design and Traffic Control, Homburger, Deakin, Bosselmann, Smith, and Beukers (Institute of Transportation Engineers), 1989
- Residential Streets, American Society of Civil Engineers, National Association of Home Builders, and the Urban Land Institute, 1990
- Traditional Neighborhood Development: Street Design Guidelines, Institute of Transportation Engineers, 1999

Designing for Appropriate Speeds

The following paragraph from *Residential Streets* (ASCE/NAHB/ULI, 1990) provides a useful summary of the task of designing residential streets to minimize speeding problems:

> "The selection of appropriate pavement widths must account for probable peak traffic volume, parking needs and controls, likely vehicle speeds, and limitations imposed by sight distances, climate, terrain, and maintenance requirements. Designers should select the *minimum* width that will reasonably satisfy all realistic needs, thereby minimizing construction and average annual maintenance costs. The tendency of many communities to equate wider streets with better streets and to design traffic and parking lanes as though the street were a "microfreeway" is a highly questionable practice. Certainly the provision of 11- or 12-

foot clear traffic lanes is an open invitation to increased traffic speeds."

Residential Streets goes on to recommend pavement widths for access streets, subcollectors, and collector streets. In addition to wide streets, long, straight, and uninterrupted stretches of residential roadways can also induce drivers to accelerate to unsafe speeds, increasing noise and risk of accidents with pedestrians and other vehicles. The following attributes should be considered when designing residential streets.

- ***Travel Lane Width*** – Travel lanes are often designed with excessive widths. To minimize drivers' propensity to speed, residential travel lanes on local streets should be designed to be no more than 10 feet wide; the *Draft Street Design Guidelines* would allow eight-foot wide travel lanes on low-volume residential streets. Wide shoulders should not be included unless they are needed to accommodate demand for parking or are striped as bicycle lanes. If excess width is provided in anticipation of a future need for traffic capacity, then in the short-term this width should be occupied by appropriately spaced chokers or other traffic calming measures (see Chapter II).

- ***Parking Lanes*** – Excessive width is sometimes provided for on-street parking in places where adjacent land uses generate little parking demand, leaving long gaps of unused space adjacent to the travel lane. This can often be the case along residential collector streets with few front-on houses. If the parking demand can be accommodated elsewhere, the parking lanes should be eliminated and the street width reduced accordingly.

- ***Block Length*** – Some street networks leave excessively long blocks without interrupting intersections. Drivers that travel a long distance (600 feet or greater) without being required to slow or stop by traffic control or traffic calming devices tend to travel at speeds higher than the limit. To minimize this effect, the street network can be designed such that street blocks are interrupted by streets of sufficient traffic volumes to warrant a traffic control device (e.g. a traffic circle or stop sign) on the street of concern. Shorter block lengths also facilitate pedestrian movement throughout the neighborhood. Acceptable block lengths for low and medium volume residential streets should not

exceed 600 and 800 feet respectively, while collector street block lengths should not exceed 1,000 feet[1].

Designing for Local Traffic

If designed improperly, some residential collector streets can become cut-through routes, or routes used by non-local motorists as a means of bypassing congested or circuitous arterial roads. In these cases, the residential collector should be modified in one of two ways.

- The collector can be designed with a deviating path so that the overall distance by collector is greater than the distance by arterial.
- The residential roadway network can be designed such that traffic-controlled intersections interrupt the parallel collector route sufficiently that the travel time by collector is greater than the travel time by arterial.

Pedestrian/Vehicle Conflict Areas

Some elements of residential areas, such as schools and parks, have particularly high potential for vehicle and pedestrian conflicts because of the pedestrian activity they generate. The major pedestrian routes to school should be identified and traffic controls should be structured so that the number of crossings at uncontrolled cross-streets is minimized. For both schools and parks, entrances tend to focus pedestrian street crossings at particular locations. These entrances can be made safer by combining them with roadway intersections, so that the intersection's traffic control can also allocate right-of-way to pedestrians.

If a pedestrian-oriented land use is located in an area where speeding or high traffic volumes are unavoidable, then traffic calming measures should be selected that incorporate pedestrian accommodations. For example, at an intersection, bulbouts or center island narrowings should be given some preference over other measures, such as

[1] City of Stockton Street Design Manual, 2003.

intersection realignment. Midblock locations can benefit from such treatments as chokers or chicanes.

Developing a Traffic Calming Plan

When a proposed street layout cannot be modified in such a way that will eliminate all potential traffic problems, a traffic calming plan should be developed. The procedure for developing a traffic calming plan should be the one described in Chapter II, with the following exceptions:

- For volume-related problems, traffic volume data will only be available in the form of traffic forecasts, and these will typically be limited to the major roads. Some manual traffic volume estimates may be required using land use quantities and trip generation rates for the proposed development.

- For speed-related problems, existing travel speed data will not be available. Consequently, a response to anticipated speeding problems would need to rely on roadway geometry. For example, if a block length is greater than 600 feet, then traffic calming measures could be used to break up the block into segments that are each shorter than 600 feet.

- Anticipated safety problems will likely revolve around land uses that generate pedestrian activity, such as schools, parks, and community centers. The placement of traffic calming devices that include pedestrian crossings should take into consideration the planned locations of walkways, gates, and building entrances for these land uses.

- For some traffic calming measures, particularly those involving modified roadway curbs, significant cost-savings can be achieved by constructing them concurrent with roadway construction. Consequently, when selecting a type of traffic calming measure, some additional preference should be given to measures that take advantage of these cost-savings.

V. TOOLBOX OF TRAFFIC CALMING MEASURES

The following traffic calming measures constitute the standard "toolbox" of devices available to citizens and Public Works staff when developing neighborhood traffic management plans. The devices are divided into the following types:

- Phase I Measures:
  - Non-Physical Measures;
  - Narrowing Measures;
  - Horizontal Deflection Measures;
- Phase II Measures:
  - Diversion Measures.

For each non-physical and physical measure in the toolbox, a description, photograph, list of advantages and disadvantages, and approximate cost are provided. In addition, all physical traffic calming measure include an overhead schematic and detailed standard designs which are located in Appendix A.

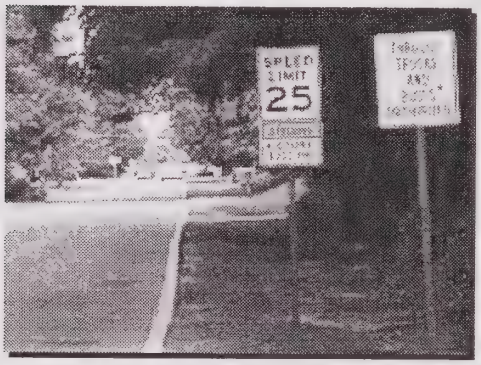
Phase I Measures
Non-Physical Measures

Description

Non-physical measures include any measures that do not require the construction of physical modifications to the roadway. This category includes signing and striping modifications, as well as temporary use of certain enforcement strategies.

- **Targeted Speed Enforcement**
- **Radar Trailers**
- **Speed Feedback Signs**
- **Lane Striping**
- **Optical Bars**
- **Signage**
- **Speed Legend**
- **Centerline or Edgeline Botts Dots**
- **High Visibility Crosswalk**
- **Angled Parking**

TARGETED SPEED ENFORCEMENT



The TCC identifies locations for temporary targeted enforcement enhancements, based on personal observations and survey comments. A request is then submitted to the Police Department for the desired enforcement. Because of limited citywide resources, the targeted enforcement will not be continued indefinitely. Targeted enforcement may also be used in conjunction with new traffic calming devices to help drivers become aware of the new restrictions.

Approximate Cost: Varies.

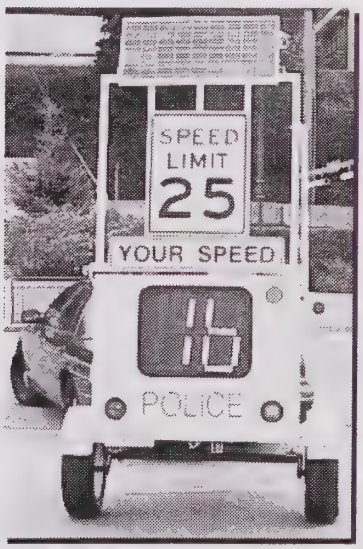
Advantages

- Inexpensive if used temporarily
- Does not require time for design
- Does not slow trucks, buses, and emergency vehicles
- Effective in reducing speeds in a short time frame

Disadvantages

- Expensive to maintain an increased level of enforcement
- Effectiveness may be temporary

RADAR TRAILER



A radar trailer is a device that measures each approaching vehicle's speed and displays it next to the legal speed limit in clear view of the driver, reminding speeding drivers to slow to the speed limit. They can be easily placed on a street for a limited amount of time then relocated to another street, allowing a single device to be effective in many locations.

Approximate Cost: $6,000 - $20,000

Advantages

- Inexpensive if used temporarily
- Does not require time for design
- Does not slow emergency vehicles
- Effective in reducing speeds in the short-run

Disadvantages

- Effectiveness may be temporary
- Aesthetics
- Only effective for one direction of travel
- Subject to vandalism

SPEED FEEDBACK SIGNS

Speed feedback signs perform the same functions as radar trailers but are permanent. Real-time speeds are relayed to drivers and flash when speeds exceed the limit. Speed feedback signs are typically mounted on or near speed limit signs and can also be mobile units.

Approximate Cost: $3,300 - $4,200





Advantages

- Inexpensive
- Does not require time for design
- Does not slow emergency vehicles
- Effective in reducing speeds in a short time frame

Disadvantages

- Requires power source
- Only effective for one direction of travel
- Long-term effectiveness uncertain
- Subject to vandalism

LANE STRIPING

Lane striping can be used to create formal bicycle lanes, parking lanes, or simple edge lines. As a traffic calming measure, they are used to narrow the travel lanes for vehicles to encourage drivers to lower their speeds. The past evidence on speed reductions is, however, inconclusive.



Approximate Cost: $1 per linear foot

Advantages

- Inexpensive
- Can be used to create bicycle lanes or delineate on-street parking
- Does not require time for design
- Does not slow emergency vehicles

Disadvantages

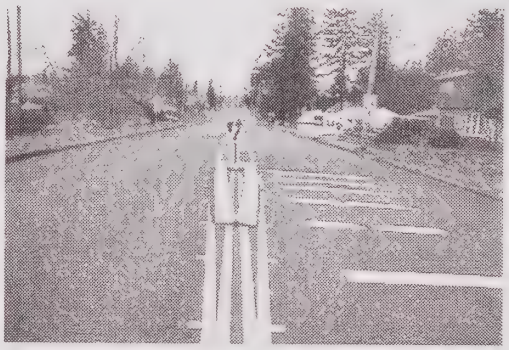
- Has not been shown to significantly reduce travel speeds
- Increases regular maintenance

OPTICAL SPEED BARS

Optical speed bars are a series of pavement markings spaced at decreasing distances. They have typically been used in construction areas to provide drivers with the impression of increased speed.

Approximate Cost: $1 per linear foot





Advantages

- Inexpensive
- Reduction in 85th percentile speed
- Does not slow bus and emergency vehicles
- Does not require time for design

Disadvantages

- Effectiveness diminishes after repeated use
- Aesthetics

SIGNAGE

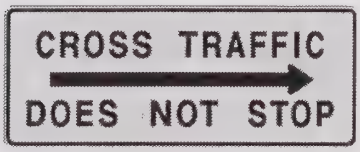


Signage that can be used as traffic calming measures include:

- Speed Limit Signs
- Truck Restriction Signs
- "Cross Traffic Does Not Stop" Signs



For speed limit signs to be eligible for radar enforcement, they must be set using an appropriate engineering and speed study.



Approximate Cost: $200 per sign

Advantages

- Inexpensive
- Does not require time for design
- Turn restrictions can reduce cut-through traffic
- Does not significantly slow emergency vehicles

Disadvantages

- Speed limit signs are ineffective if unaccompanied by increased police enforcement
- If speed limit is set unreasonably low, drivers are more likely to exceed it

SPEED LEGENDS

Speed legends are numerals painted on the roadway indicating the current speed limit in miles per hour. They are usually placed near speed limit signposts. Speed legends can be useful in reinforcing a reduction in speed limit between one segment of a roadway and another segment. They may also be placed at major entry points into a residential area.



Advantages

- Inexpensive
- Helps reinforce a change in speed limit
- Does not require time for design
- Does not slow emergency vehicles

Disadvantages

- Has not been shown to significantly reduce travel speeds

Approximate Cost: $150 each

BOTTS DOTS AND RAISED REFLECTORS

Botts dots and raised reflectors, or "raised pavement markers," are small bumps lining the centerline or edgeline of a roadway. They are often used on curves where vehicles have a tendency to deviate outside of the proper lane, risking collision. Raised reflectors improve the nighttime visibility of the roadway edges.



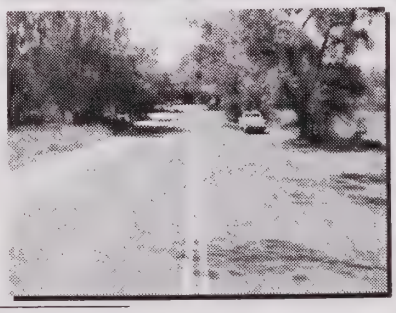
Botts dots can be arranged into a rectangular array across the roadway, creating a *rumble strip*, which causes a rumbling sensation to drivers as they cross. These can reduce travel speeds but also increase roadway noise considerably. Consequently, rumble strips are only placed in very low-density areas because of the noise factor.

Advantages

- Inexpensive
- Does not slow trucks, buses, and emergency vehicles
- Can help keep drivers in the appropriate travel lane on curves and under low-visibility conditions

Disadvantages

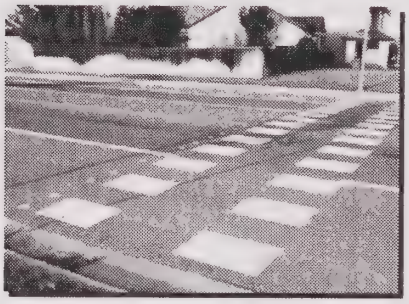
- Noise caused by rumble strips may bother neighborhood residents



Approximate Cost: $4.50 per marker

HIGH-VISIBILITY CROSSWALK

High-visibility crosswalks use special marking patterns and raised reflectors to increase the visibility of a crosswalk at night. A "triple-four" marking pattern is created by painting two rows of four-foot wide rectangles, separated by four feet of unpainted space across the roadway. Raised reflectors are placed at the approach edges of these rectangles. The unpainted space along the center of the crosswalk allows wheelchairs and foot traffic to cross in the rain without sliding problems across the paint.



Approximate Cost: $2,000

Advantages

- Increase visibility under low-visibility conditions
- Focus crossing pedestrians at a single location
- Motorists may not "tune out" IPFs as typical overhead beacons

Disadvantages

- May give pedestrians a false sense of security
- Requires more maintenance than normal crosswalks
- Can decrease effectiveness of coordinated traffic signals

In-Pavement Flashers (IPF) are another type of High-visibility crosswalk. They are typically installed at mid-block pedestrian crossings and feature a series of flashing lights flanking the outer edge of the crosswalk. The flashing lights are activated through a push button detector. IPFs are most effective on multi-lane undivided roadways near pedestrian trip generators such as schools, commercial areas, downtown areas, etc.





Approximate Cost: $20,000-$40,000

Advantages

- Increase visibility under low-visibility conditions
- Focus crossing pedestrians at a single location

Disadvantages

- May give pedestrians a false sense of security, causing them to pay less attention to traffic
- Require more maintenance than normal crosswalks

ANGLED PARKING

Angled parking reorients on-street parking spaces to a 45-degree angle, increasing the number of parking spaces and reducing the width of the roadway available for travel lanes. Angled parking is also easier for vehicles to maneuver into and out of than parallel parking. Consequently, it works well in locations with high parking demand, such as multi-family residences, and high turnover rates, such as commercial and mixed-use areas.

Approximate Cost: $250- $300 per stall



Advantages

- Reduces speeds by narrowing the travel lanes
- Increases the number of parking spaces
- Makes parking maneuvers easier and takes less time than with parallel parking
- Favored by businesses and multi-family residences

Disadvantages

- Precludes the use of bike lanes (unless roadway is wider than 58 feet)
- Ineffective on streets with frequent driveways
- May be incompatible with one-way streets approaching a two-way segment

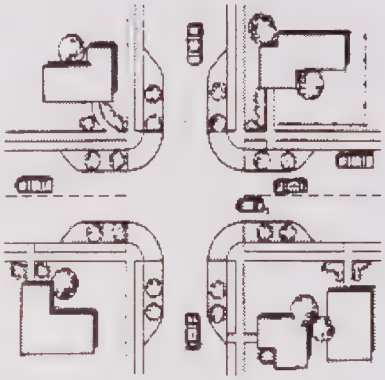
Phase I Measures
Narrowing Devices

Description

Narrowing devices use raised islands and curb extensions to narrow the travel lane for motorists. The narrowing devices in the toolbox include:

- **Bulbouts**
- **Two-Lane Chokers**
- **Center Island Narrowings/Pedestrian Refuge Islands**

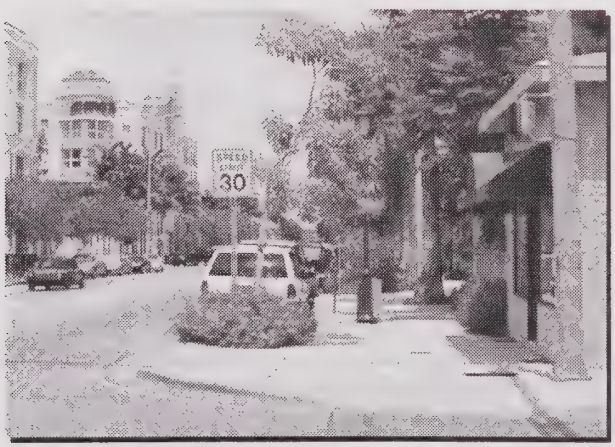
BULBOUTS



Bulbouts (neckdowns, intersection narrowings, safe crosses, etc.) are curb extensions that reduce roadway width curb to curb at either midblock or intersection locations. Midblock treatments narrow the travel lane but do not provide additional sidewalk width. Intersection treatments actually "pedestrianize" intersections by shortening crossing distances for pedestrians by tightening curb radii thereby reducing the speeds of turning vehicles. Intersection treatments can be retrofit into existing intersections without modifing the existing drainage or they can be designed to provide additional sidewalk width for increased pedestrian use or street furniture. The effects are increased pedestrian comfort and safety at the intersection.

Approximate Cost: $2,000-5,000 for four corners (without drainage modification) or $25,000 per corner with full drainage modifications

Measured Impacts		
Speed Impacts	**Reduction in 85th Percentile Speeds between Slow Points**	**-7%**
Volume Impacts	**Reduction in Vehicles per Day**	
Source: Traffic Calming: State of the Practice, 2000.		



Advantages

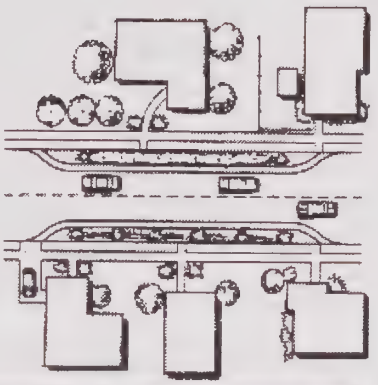
- Improves pedestrian circulation and standing space on sidewalk area
- Through and left-turn movements are easily negotiable by large vehicles
- Creates protected on-street parking bays
- Reduces speeds (especially right-turning vehicles) and traffic volumes
- Provides opportunity for landscaping and street furniture

Disadvantages

- Effectiveness is limited by the absence of vertical or horizontal deflection
- May slow right-turning emergency vehicles
- Potential loss of on-street parking
- May require bicyclists to briefly merge with vehicular traffic

TWO-LANE CHOKER

Chokers are curb extensions at mid-block that narrow a street by widening the sidewalk or planting strip. If marked as crosswalks, they are also called safe crosses. Chokers leave the street cross section with two lanes that are narrower than the normal cross section.



Approximate Cost: $5,000-10,000

Measured Impacts		
Volume Impacts	**Reduction in 85th Percentile Speeds between Slow Points**	**-7%**
	Reduction in Vehicles per Day	**-10%**
Source: Traffic Calming: State of the Practice, 2000.		



Advantages

- Easily negotiable by large vehicles (such as fire trucks)
- If designed well, can have positive aesthetic value
- Reduces both speeds and volumes
- Opportunity for landscaping

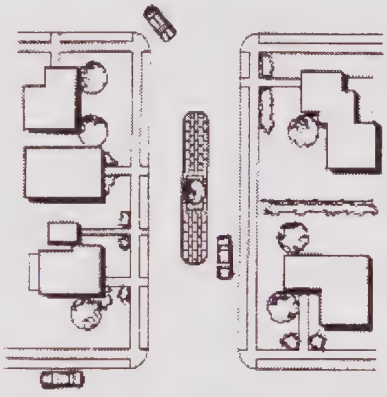
Disadvantages

- Effect on vehicle speeds is limited by the absence of any horizontal deflection
- May require bicyclists to briefly merge with vehicular traffic
- Potential loss of on-street parking
- Maintenance of landscaping (City vs. residents)

CENTER ISLAND NARROWING/PEDESTRIAN REFUGE ISLAND

Center island narrowings are raised islands located along the centerline of a street that narrow the travel lanes at that location. They are often landscaped to provide visual amenity. Placed at the entrance to a neighborhood and often combined with textured pavement, they are sometimes called "gateways." Fitted with a gap to allow pedestrians to walk through at a crosswalk, they are often called "pedestrian refuges".

Approximate Cost: $6,000-9,000



Measured Impacts		
Speed Impacts	**Reduction in 85th Percentile Speeds between Slow Points**	**-7%**
Volume Impacts	**Reduction in Vehicles per Day**	**-10%**

Source: Traffic Calming: State of the Practice, 2000.





Advantages

- Increases pedestrian safety
- If designed well, can have positive aesthetic value
- Reduces traffic volumes
- Opportunity for landscaping

Disadvantages

- Effect on vehicle speeds is limited by the absence of any vertical or horizontal deflection
- Potential loss of on-street parking
- Maintenance of landscaping (City vs. residents)

Phase I Measures
Horizontal Deflection Devices

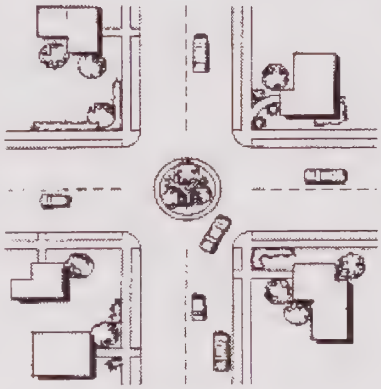
Description

Horizontal deflection devices use raised islands and curb extensions to eliminate straight-line paths along roadways and through intersections. The horizontal deflection devices in the toolbox include:

- **Traffic Circles**
- **Roundabouts**
- **Lateral Shifts**
- **Chicanes**

TRAFFIC CIRCLE

Traffic circles are raised islands, placed in intersections, around which traffic circulates. They are usually circular in shape and landscaped in their center islands, though not always. Traffic controls at the approaches vary by location. Circles prevent drivers from speeding through intersections by impeding the straight-through movement and forcing drivers to slow down to yield. Drivers must first turn to the right, then to the left as they pass the circle, and then back to the right again after clearing the circle.



Approximate Cost: $10,000

Measured Impacts		
Speed Impacts	**Reduction in 85th Percentile Speeds between Slow Points**	**-11%**
Volume Impacts	**Reduction in Vehicles per Day**	**-5%**
Safety Impacts	**Reduction in Average Annual Number of Collisions**	**-71%**

Source: Traffic Calming: State of the Practice, 2000.



Advantages

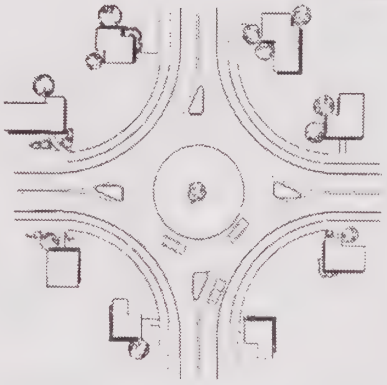
- If designed well, can have positive aesthetic value
- Very effective in moderating speeds and improving safety
- Opportunity for landscaping

Disadvantages

- Difficult for large vehicles (such as fire trucks) to circumnavigate
- Must be designed so that the circulating lane does not encroach on crosswalks
- Potential loss of on-street parking
- Maintenance of landscaping (City vs. residents)

ROUNDABOUT

Like traffic circles, roundabouts require traffic to circulate counterclockwise around a center island. But unlike circles, roundabouts are used on higher volume streets to allocate rights-of-way among competing movements. They are found primarily on arterial and collector streets, often substituting for traffic signals or all-way STOP signs. They are larger than neighborhood traffic circles and typically have raised splitter islands to channel approaching traffic to the right.



Measured Impacts		
Speed Impacts	**Reduction in 85th Percentile Speeds between Slow Points**	**I/D**
Volume Impacts	**Reduction in Vehicles per Day**	**I/D**
Safety Impacts	**Reduction in Average Annual Number of Collisions**	**-1.5% to 33%**

Notes: I/D = Insufficient Data
Source: Traffic Calming: State of the Practice, 2000.

Approximate Cost: $100,000-$200,000 for retrofits; $100,000 for a single-lane and $150,000 for two-lane in new developments.



Advantages

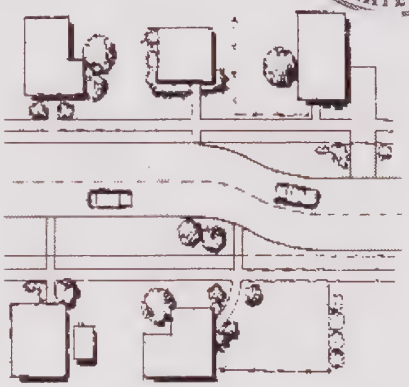
- Moderates traffic speed on an arterial
- Enhanced safety compared to a traffic signal
- Minimizes queuing at approaches to the intersection
- Less expensive to operate than traffic signals
- Provides opportunity for landscaping and street furniture

Disadvantages

- May require major reconstruction of an existing intersection
- Loss of on-street parking
- Increases pedestrian distance from one crosswalk to the next
- Difficult for visually impaired pedestrian to navigate
- Maintenance of landscaping (City vs. residents)

LATERAL SHIFT

Lateral shifts are curb extensions on otherwise straight streets that cause travel lanes to bend one way and then bend back the other way to the original direction of travel. Lateral shifts, with just the right degree of deflection, are one of the few measures that have been used on collectors or even arterials, where high traffic volumes and high posted speeds preclude more abrupt measures.



Approximate Cost: Varies by size of offset and length of transition.

Measured Impacts		
Speed Impacts	**Reduction in 85th Percentile Speeds between Slow Points**	**I/D**
Volume Impacts	**Reduction in Vehicles per Day**	**I/D**





Advantages

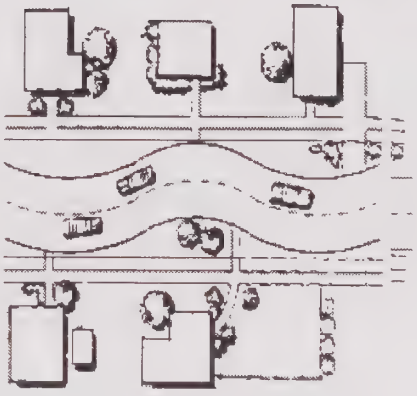
- Can accommodate higher traffic volumes than many other traffic calming measures
- Easily negotiable by large vehicles (such as fire trucks)
- Opportunity for landscaping and street furniture

Disadvantages

- Not as effective reducing speeds as other traffic calming measures
- Potential loss of on-street parking
- Must be designed carefully to discourage drivers from deviating out of the appropriate lane
- Maintenance of Landscaping (City vs. residents)

CHICANE

Chicanes are curb extensions that alternate from one side of the street to the other, forming S-shaped curves. Chicanes can also be created by alternating on-street parking, either diagonal or parallel, between one side of the road and the other. Each parking bay can be created either by restriping the roadway or by installing raised landscaped islands at each end, creating a protected parking area.



Approximate Cost: $8,000-14,000

Measured Impacts		
Speed Impacts	**Reduction in 85th Percentile Speeds between Slow Points**	**I/D**
Volume Impacts	**Reduction in Vehicles per Day**	**I/D**
Safety Impacts	**Reduction in Average Annual Number of Collisions**	**I/D**

Notes: I/D = Insufficient Data
Source: Traffic Calming: State of the Practice, 2000.



Advantages

- Discourages high speeds by forcing horizontal deflection
- Easily negotiable by large vehicles (such as fire trucks) except under heavy traffic conditions
- Provides opportunity for landscaping and street furniture

Disadvantages

- Must be designed carefully to discourage drivers from deviating out of the appropriate lane
- Curb realignment and landscaping can be costly, especially if there are drainage issues
- Potential loss of on-street parking
- Maintenance of landscaping (City vs. residents)

Phase II Measures
Diversion Devices

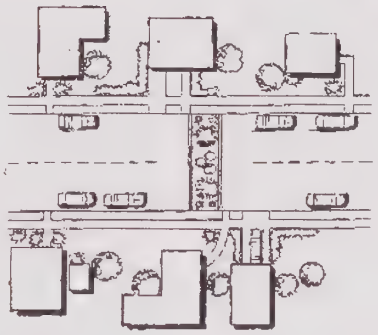
Description

Diversion devices use raised islands and curb extensions to preclude particular vehicle movements, such as left-turn or through movements, usually at an intersection. These devices can only be considered after Phase I devices have been attempted and fail to resolve the traffic problem. The diversion devices in the toolbox include:

- **Full Closures**
- **Half Closures**
- **Diagonal Diverters**
- **Median Barriers**
- **Forced Turn Islands**

FULL CLOSURE

Full street closures are barriers placed across a street to close the street completely to through traffic, usually leaving only sidewalks or bicycle paths open. The barriers may consist of landscaped islands, walls, gates, side-by-side bollards, or any other obstructions that leave an opening smaller than the width of a passenger car.



Approximate Cost: $30,000-100,000

Measured Impacts		
Volume Impacts	**Reduction in Vehicles per Day**	
Source: Traffic Calming: State of the Practice, 2000.		





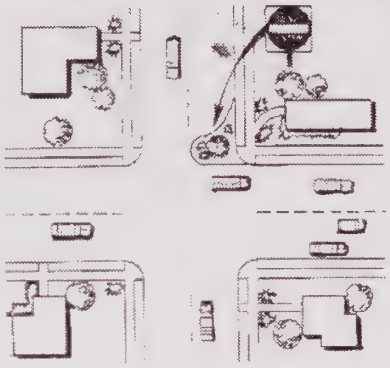
Advantages

- Able to maintain pedestrian and bicycle access
- Very effective in reducing traffic volumes
- Opportunity for landscaping

Disadvantages

- Requires legal procedures for public street closures
- Causes circuitous routes for local residents and emergency services
- May be expensive
- May limit access to businesses
- Maintenance of landscaping (City vs. residents

HALF CLOSURE



Half street closures are barriers that block travel in one direction for a short distance on otherwise two-way streets. Half closures are the most common volume control measure after full street closures. Half closures are often used in sets to make travel through neighborhoods with gridded streets circuitous rather than direct. That is, half closures are not lined up along a border, which would preclude through movement, but instead are staggered, which leaves through movement possible but less attractive than alternative routes.

Approximate Cost: $6,500

Measured Impacts		
Speed Impacts	**Reduction in 85th Percentile Speeds between Slow Points**	**-19%**
Volume Impacts	**Reduction in Vehicles per Day**	**-42%**
Source: Traffic Calming: State of the Practice, 2000.		



Advantages

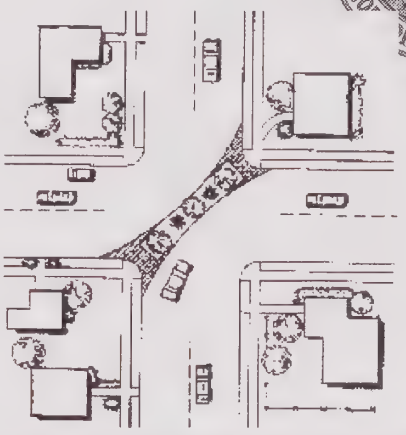
- Able to maintain two-way bicycle access
- Effective in reducing traffic volumes

Disadvantages

- Causes circuitous routes for local residents and emergency services
- May limit access to businesses
- Drivers can circumvent the barrier

DIAGONAL DIVERTER

Diagonal diverters are barriers placed diagonally across an intersection, blocking through movement. Like half closures, diagonal diverters are usually staggered to create circuitous routes through neighborhoods.



Approximate Cost: $15,000-35,000

Measured Impacts		
Speed Impacts	**Reduction in 85th Percentile Speeds between Slow Points**	**-4%**



Advantages

- Does not require a closure per se, only a redirection of existing streets
- Able to maintain full pedestrian and bicycle access
- Reduces traffic volumes

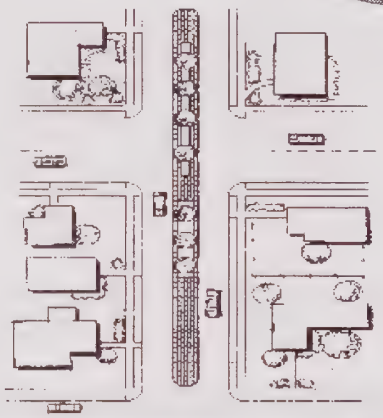
Disadvantages

- Causes circuitous routes for local residents and emergency services
- May be expensive
- May require reconstruction of corner curbs

MEDIAN BARRIER

Median barriers are raised islands that are located along the centerline of a street and continue through an intersection so as to block through movement at a cross street.

Approximate Cost: $15,000-20,000 per 100 feet



Measured Impacts		
Volume Impacts	**Reduction in Vehicles per Day**	**-31%**

Source: Traffic Calming: State of the Practice, 2000.



Advantages

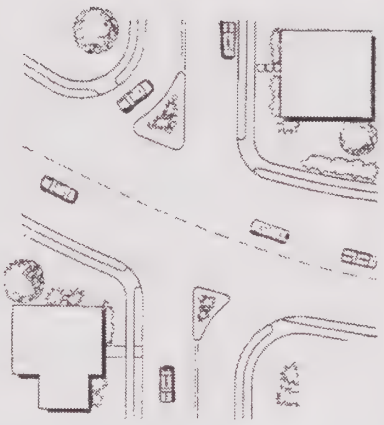
- Can improve safety at an intersection of a local street and a major street by prohibiting dangerous turning movements
- Can reduce traffic volumes on a cut-through route that crosses a major street

Disadvantages

- Requires available street width on the major street
- Limits turns to and from the side street for local residents and emergency services

FORCED-TURN ISLAND

Forced turn islands are raised islands that block certain movements on approaches to an intersection.



Approximate Cost: $3,000-5,000

Measured Impacts		
Volume Impacts	**Reduction in Vehicles per Day**	**-31%**

Source: Traffic Calming: State of the Practice, 2000.



Advantages

- Can improve safety at an intersection of a local street and a major street by prohibiting dangerous turning movements
- Reduces traffic volumes

Disadvantages

- If designed improperly, drivers can maneuver around the island to make an illegal movement
- May simply divert a traffic problem to a different street

EFFECTIVENESS COMPARISON

Table 4 summarizes the effectiveness data that has been compiled for each of the traffic calming measures in the toolbox. Note that these data are averages. Actual effectiveness can vary based on site-specific circumstances, such as proximity to major roads and the availability of alternate routes.

Table 4 – Quantitative Impacts of Traffic Calming Measures

Types of Measures	Effectiveness									
	85th Percentile Speeds				Vehicles per Day		Average Annual Collisions			
	Before	After	Change	Percent Change	Change	Percent Change	Before	After	Change	Percent Change
Phase I Non-Physical Measures	I/D									
Phase I Narrowing Measures										
Bulbouts Two-Lane Chokers Center Island Narrowings/ Pedestrian Refuges	34.9	32.3	-2.6	-7%	-293	-10%	I/D			
Phase I Horizontal Measures										
Traffic Circles	34.2	30.3	-3.9	-11%	-293	-5%	2.19	0.64	-1.55	-71%
Roundabouts (Single-Lane)	Insignificant Speed Effects				Insignificant Volume Effects		Not Recorded			-15% to –33%
Lateral Shifts	I/D				I/D		I/D			
Chicanes	I/D				I/D		I/D			
Phase II Diversion Measures										
Full Closures	I/D	I/D	I/D	I/D	-671	-44%	I/D			
Half Closures	32.3	26.3	-6.0	-19%	-1,611	-42%	I/D			
Diagonal Diverters	29.3	27.9	-1.4	-4%	-501	-35%	I/D			
Median Barriers Forced Turn Islands	I/D	I/D	I/D	I/D	-1,167	-31%	I/D			

Notes: I/D = Insufficient Data
Source: *Traffic Calming: State of the Practice* (Ewing, 1999)

VI. DESIGN GUIDELINES

This chapter identifies some physical design considerations and constraints associated with the traffic calming measures in the toolbox in the previous chapter. Engineering designs for the standard traffic calming measures in Stockton's NTMP toolbox are contained in Appendix A. These designs were developed to conform to the following considerations expressed by the advisory panel.

Emergency Response Routes

Because every situation is different, variations on the standard traffic calming devices may be appropriate in some cases. The NTMP promotes the consideration of these existing experimental measures and the exploration of new measures through continuous dialogue between Public Works, emergency services staff, and citizens of the community. The development of an official "Emergency Response Route" may aid City staff and TCC members in selecting devices that would least likely impact emergency response times.

Horizontal Deflection Measures

Traffic Circle Placement

Traffic circles are very effective in moderating speeds in existing neighborhoods. Placement of traffic circles in existing neighborhoods is determined on a case by case basis and should meet the following criteria:

- At the intersection of two local streets or a local and collector street with ADT >1,000

Traffic Circles can also be incorporated into new developments as seen fit by Development Services Review. The above installation criterion also applies.

Traffic Circle Center Island Profile

Traffic circles should be designed with both a square inner curb and a mountable apron. The apron is a shallow-sloped curb extending out from the bottom of a square curb; the apron has a low lip at its pavement-side edge. This apron effectively reduces the diameter of the center island for large vehicles, facilitating easier turns. The low lip at the apron's edge discourages vehicles from using it unless it is necessary.

Traffic Circle Turn Operations

All vehicles should circulate around the center island on left-turns.

Traffic Circles at T-Intersections

Traffic circles should have deflection on all approaches if implemented at a T-intersection. This can be implemented using one of two methods. First, a raised island can be placed at the right side of the un-deflected approach to the traffic circle to artificially introduce deflection, as shown in Figure 2 (a). Alternatively, the street curbs can be modified to allow the center island to be located at the center of the intersection, as shown in figure (b). This method may require the acquisition of additional right-of-way.

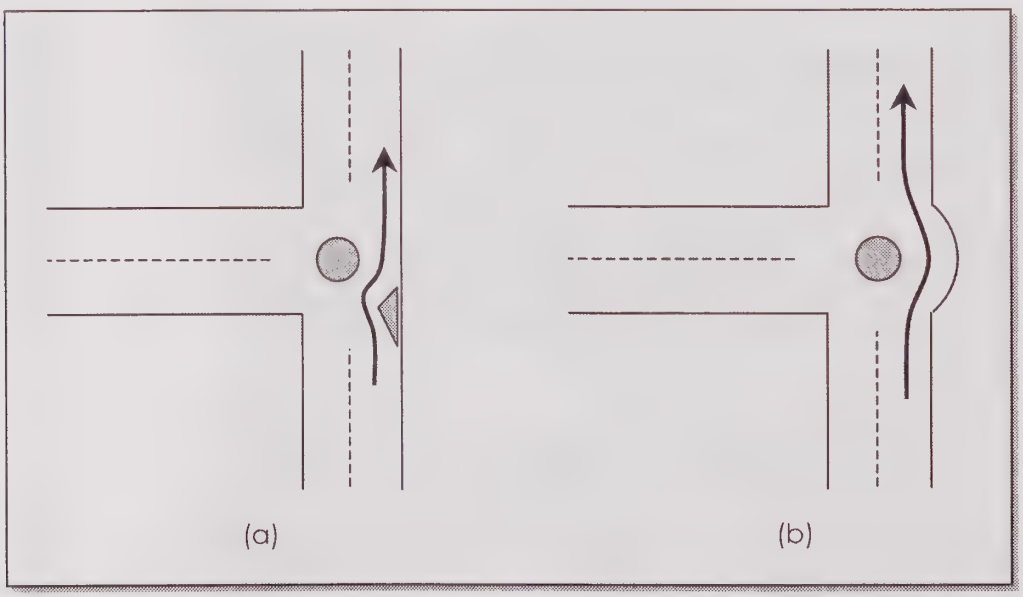


Figure 2. Roundabouts at T-Intersections

Landscaping

Landscaping on traffic calming devices serves two primary purposes. First, it increases the visibility of a device, such as a raised center island, by extending the device's vertical size and introducing more varied colors. Second, landscaping generally improves the aesthetic quality of traffic calming devices, making them more acceptable to nearby residents. Landscaping should be included on all raised islands unless it is physically infeasible to do so. In those cases, hardscape (e.g. grouted cobble) should be used instead. Trees planted on center islands must allow adequate sight distances for motorists.

Signing & Marking

Concurrent with the installation of traffic calming devices, device-specific symbol-based signs will be installed (see Appendix A Figure A-12). At the discretion of Public Works staff, advanced warning signs may also be installed. Traffic circle center islands will include signage symbolically indicating the permitted travel paths around the center island (see Figure A-12).

Special signing for bicyclists should be provided on designated bikeways. For example, the approaches to narrowing devices that do not include a bypass lane for bicyclists will include signage warning motorists to watch for merging bicyclists.

Combined Measures

Some measures from the toolbox can be combined to increase the combined effect on traffic volumes and speeds. For example, a center island narrowing may be combined with bulbouts, with the effect of a much shorter walking distance. Motorists must also react to the narrower lane and object on either side. In assessing the suitability of a proposed combined measure, the guidelines in Table 1 for both of the component devices should be applied.

Roundabouts

Roundabouts are a unique traffic control device that may be useful in a variety of situations. They are often used in lieu of all-way stop control or traffic signals as a means of increasing the capacity of the intersection and improving its operations. Roundabout treatments should be considered when a local street and collector or two collector streets meet with an ADT greater than 2,000. Roundabouts can also be designed into new developments based on this same criteria.

Roundabouts require a considerably more rigorous design process than the other traffic calming devices in the toolbox. Because of their complex design features, no generic design is included in this document. However, roundabouts should generally have the following characteristics:

- A circular travel lane operating counter-clockwise for collecting and distributing traffic
- A raised center island
- Channelized approaches
- Yield control at all approaches
- Tapered approaches to encourage entering vehicles to travel in the correct direction through the circular travel lane

In general, roundabouts in the United States tend to be used on collector streets and on low-volume minor arterial streets. The use of roundabouts is primarily constrained by traffic volumes and by geometrics. The design of every roundabout should be customized using detailed traffic and geometric information and procedures beyond what is presented here. The cursory check found in Appendix B can helpful in determining whether a roundabout is a reasonable option to consider. Also, the following examples illustrate cases where a roundabout may be appropriate:

- ***History of Accidents*** – For example, roundabouts are placed at intersections with a history of accidents, especially head-on collisions and right-angle collisions. A roundabout can help

improve safety by substantially reducing the number of conflict points and by simplifying interactions between vehicles.

- ***Minimizing Queues*** – Another case is a collector/arterial intersection located near an arterial/arterial intersection. A roundabout may be useful here because it can allocate right-of-way between both the arterial and the collector, while minimizing the queues on the approach stemming from the arterial/arterial intersection.

- ***Handling Irregular Approach Geometry*** – An intersection with greater than four approaches or with approaches that meet the intersection at irregular angles may be a candidate for a roundabout.

- ***Inexpensive Traffic Control*** – In some cases, traffic volumes at an intersection may be too high to allow acceptable operations with all-way stop control, a traffic signal is considered inappropriate due to sight distance or other constraints. If ample right-of-way is already available, a roundabout may be considered.

- ***High Proportion of U-Turns*** – If an intersection is situated where U-turns are frequent, a roundabout can facilitate those U-turns without adversely affecting the operations of the intersection as a whole.

- ***Pedestrian Accommodation*** – Roundabouts represent a trade-off for pedestrians. They can be inconvenient for pedestrians because the crosswalks are set back farther from the intersection. Additionally, roundabouts pose as a greater challenge to the visually impaired than typical intersections do. However, they are also superior to signalized intersections because crossing distances are shorter and are broken by a pedestrian refuge, and pedestrians do not need to wait for the pedestrian signal through a long traffic signal cycle.

VII. REFERENCES

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Roundabouts

- Robinson, B. W. et al (2000). *Roundabouts: An Informational Guide*. Washington, DC: Federal Highway Administration.

- Wallwork, M. (2002). *Modern Roundabouts (Web Site: http://www.roundabouts.net)*. Orange Park, FL: Alternate Street Design, P.A.

Appendix A
Standard Traffic Calming Device Designs

Triple 4 Crosswalk A-1

Traffic Circle A-2

Chicane A-3

Bulbout (Midblock treatment) A-4

Bulbout (Intersection treatment) A-5

Center Island Narrowings A-6

Choker A-7

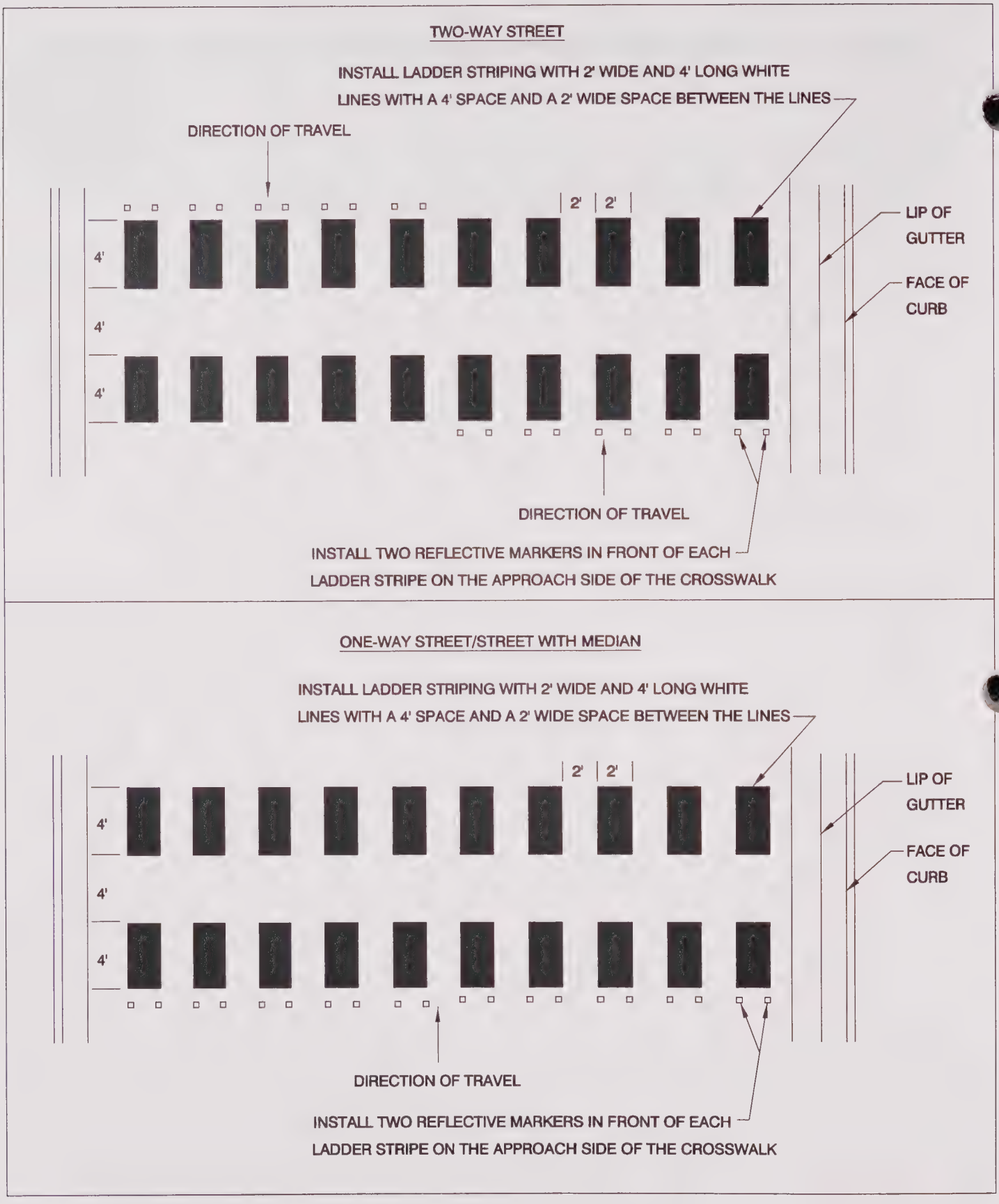
Half Closure A-8

Diagonal Diverter A-9

Median Barrier A-10

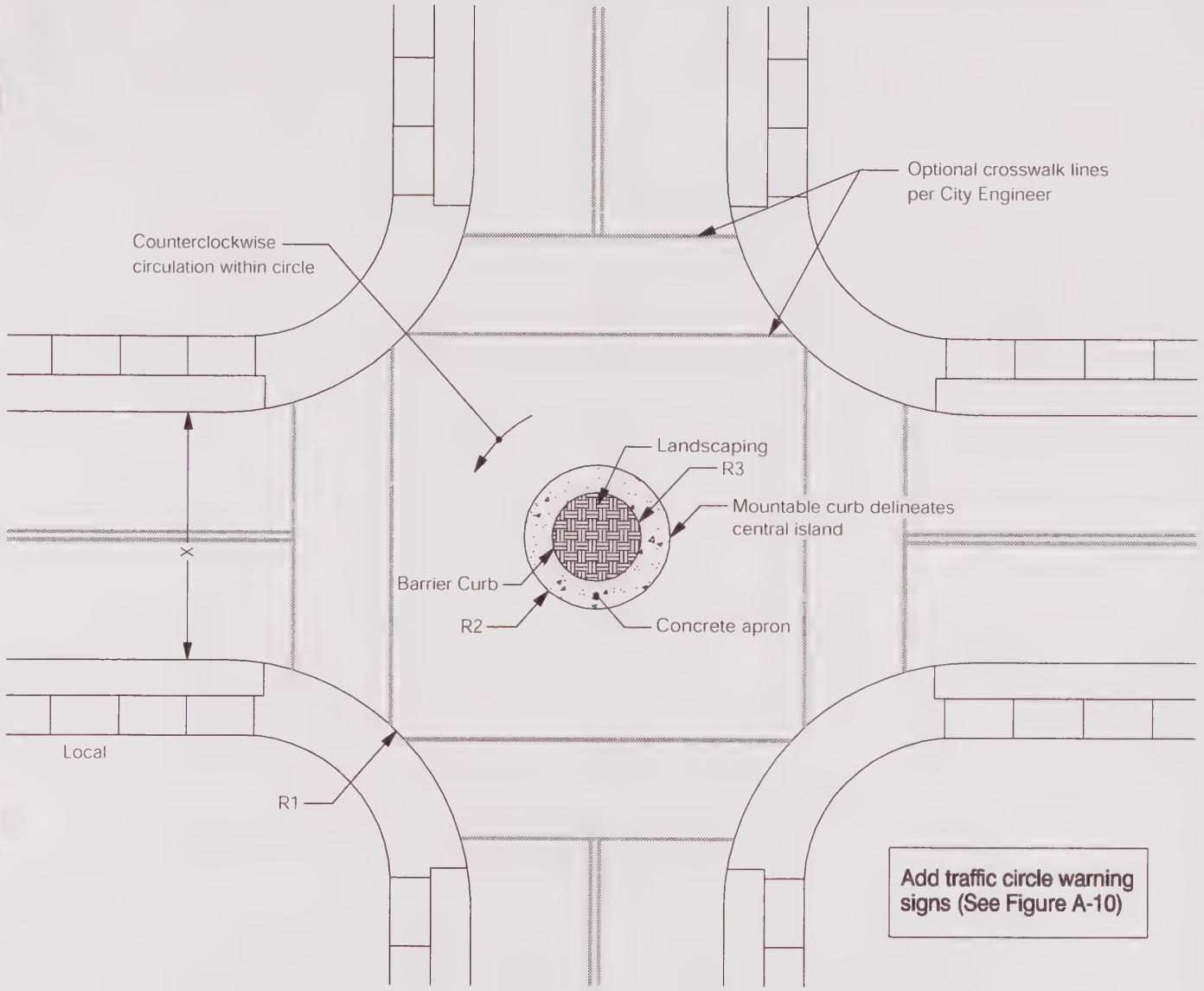
Forced Turn Island A-11

Warning Signs A-12



TRIPLE 4 CROSSWALK

FIGURE A-1

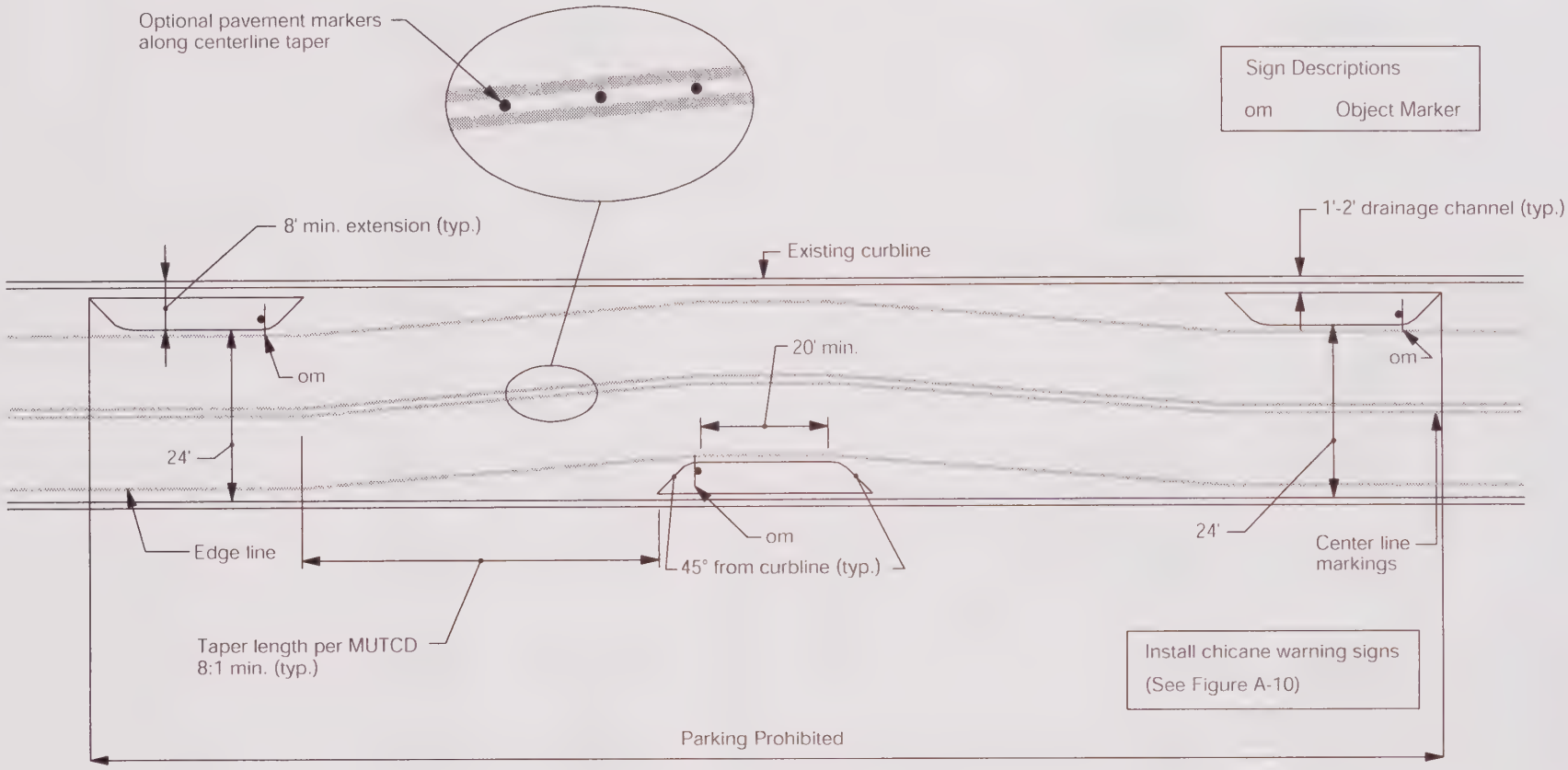


For This Street Width[2]:	Use These Curb Radii:		
	R1	R2	R3
34'	20'	20'	8'
	25'	24'	8'
32'	15'	12'	7'
	20'	18'	7'
	25'	20'	7'
30'	15'	11'	6'
	20'	15'	6'
	25'	16'	6'

NOTE: 1. Assumes equal street widths; For unequal street widths, use Autoturn to ensure adequate turning radii for the desired design vehicle.

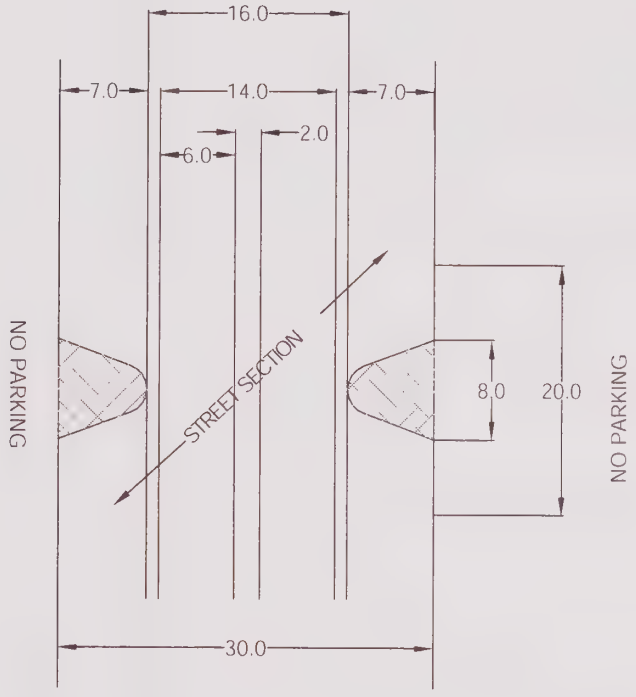
TRAFFIC CIRCLE

FIGURE A-2



CHICANE

FIGURE A-3

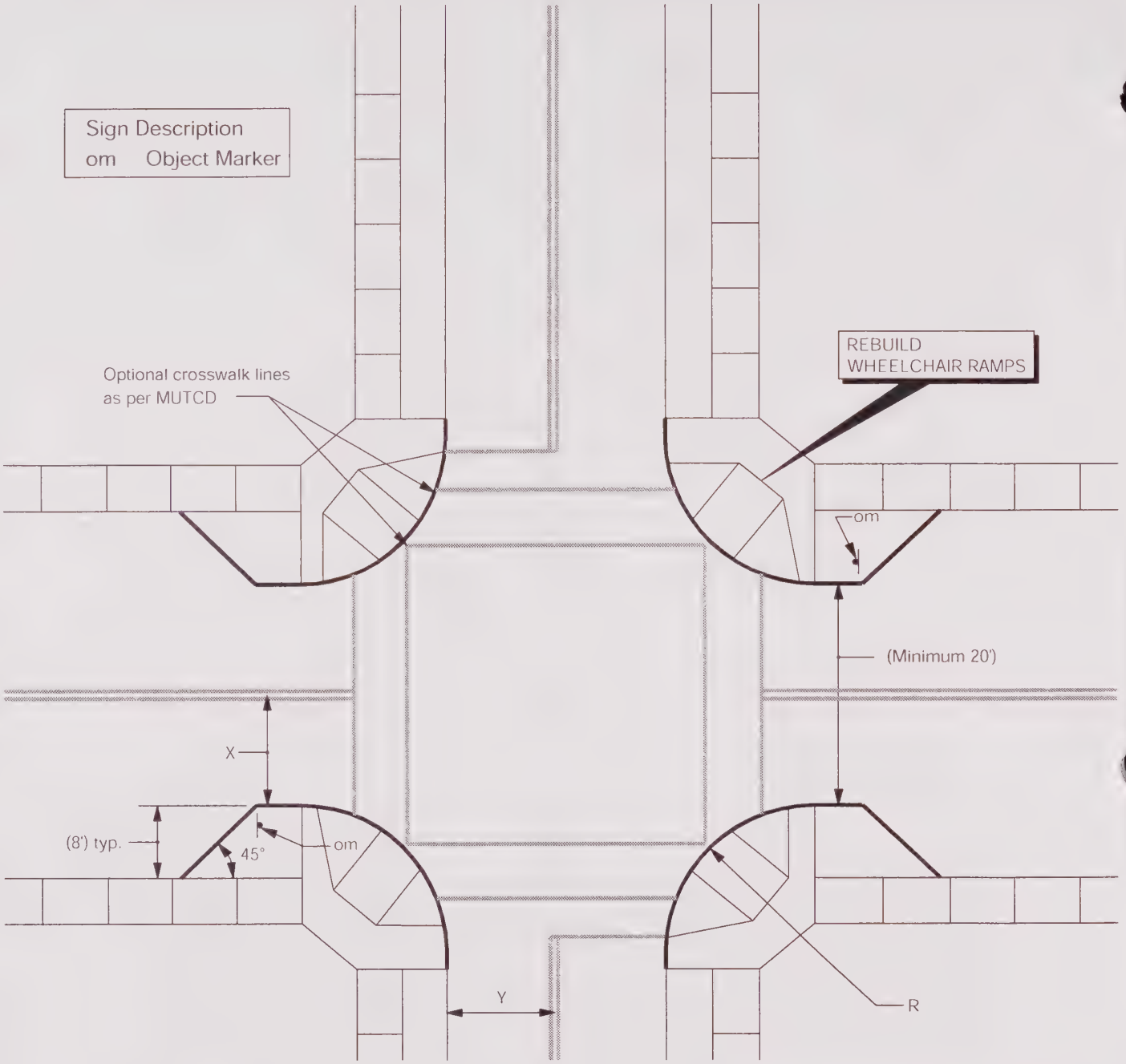


MIN. 30' WIDE STREET
FOR WIDER STREETS
MAKE BULB DEEPER

THE BULB-OUT DRAWING SHOWN IS FOR A 30 FOOT WIDE STREET. IF A STREET IS WIDER, THE BULB WOULD BE DEEPER; EACH BULB SHOWN IS SEVEN FEET DEEP. THE WIDTH BETWEEN BULBS SHOULD BE 16 FEET, WHICH ALLOWS FOR ONE FOOT BETWEEN BULB AND CAR, SIX FEET PER CAR AND TWO FEET BETWEEN CARS. THIS WOULD REQUIRE CARS TO SLOW DOWN SUBSTANTIALLY IN ORDER TO PASS. THE BULB WOULD RESTRICT PARKING FOR APPROXIMATELY 20 FEET (ONE CAR LENGTH FOR PARKING PURPOSES) IN ORDER FOR THE BULB TO BE VISIBLE, ALLOW WIDER VEHICLES TO PULL TO THE RIGHT AND ALLOW AN OPPOSING VEHICLE TO PASS. IT MAY BE POSSIBLE TO PLANT A TREE IN EACH BULB.

BULBOUT
(MIDBLOCK TREATMENT)

FIGURE A-4

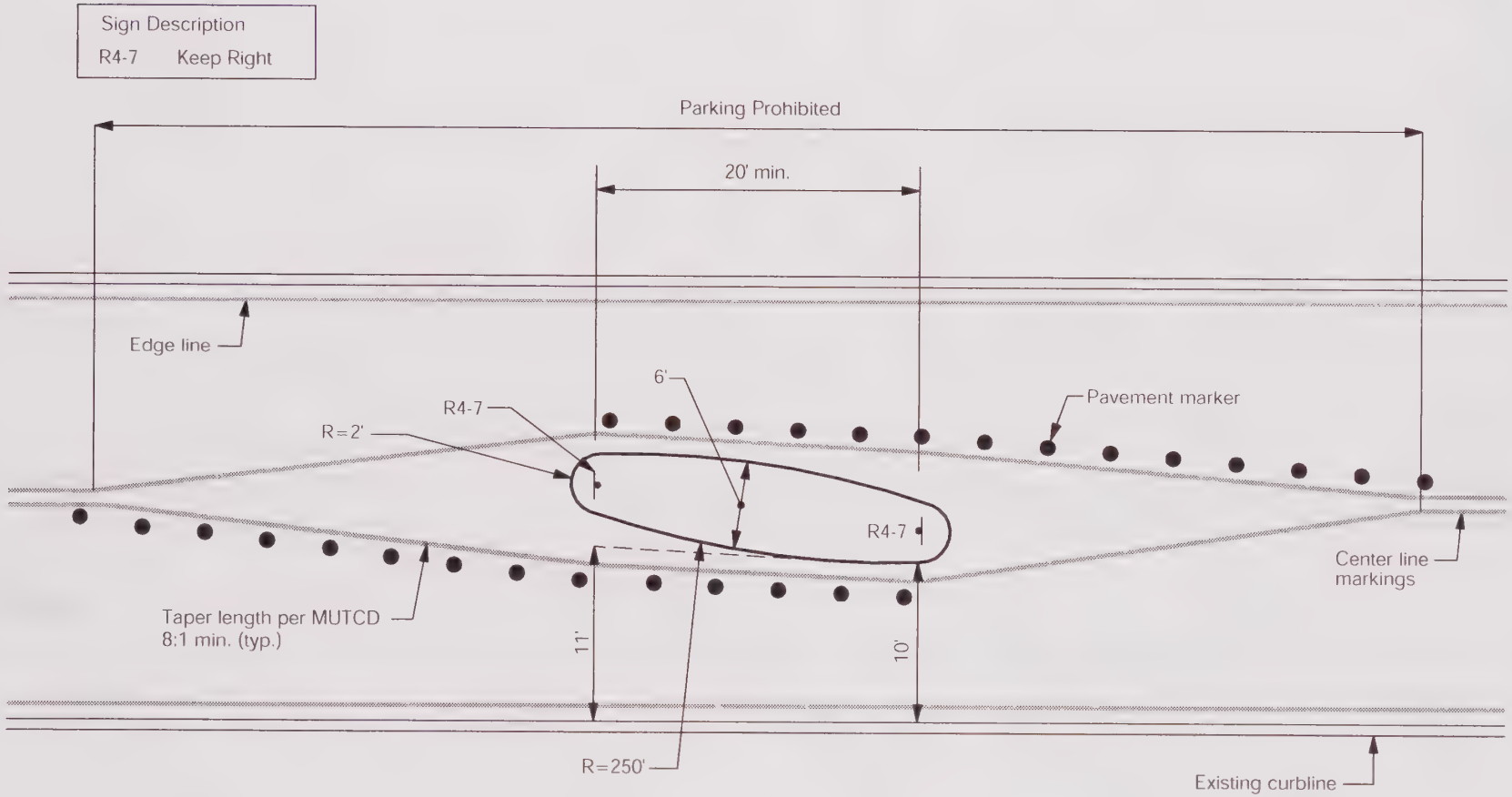


For The Street Widths:		Use This Curb Radius:
X	Y	R
12'	12'	40'
12'	14'	32'
12'	16'	26'
14'	12'	37'
14'	14'	35'
14'	16'	24'

NOTES: 1. Distance X is referenced from the center of the roadway to the lip of gutter.

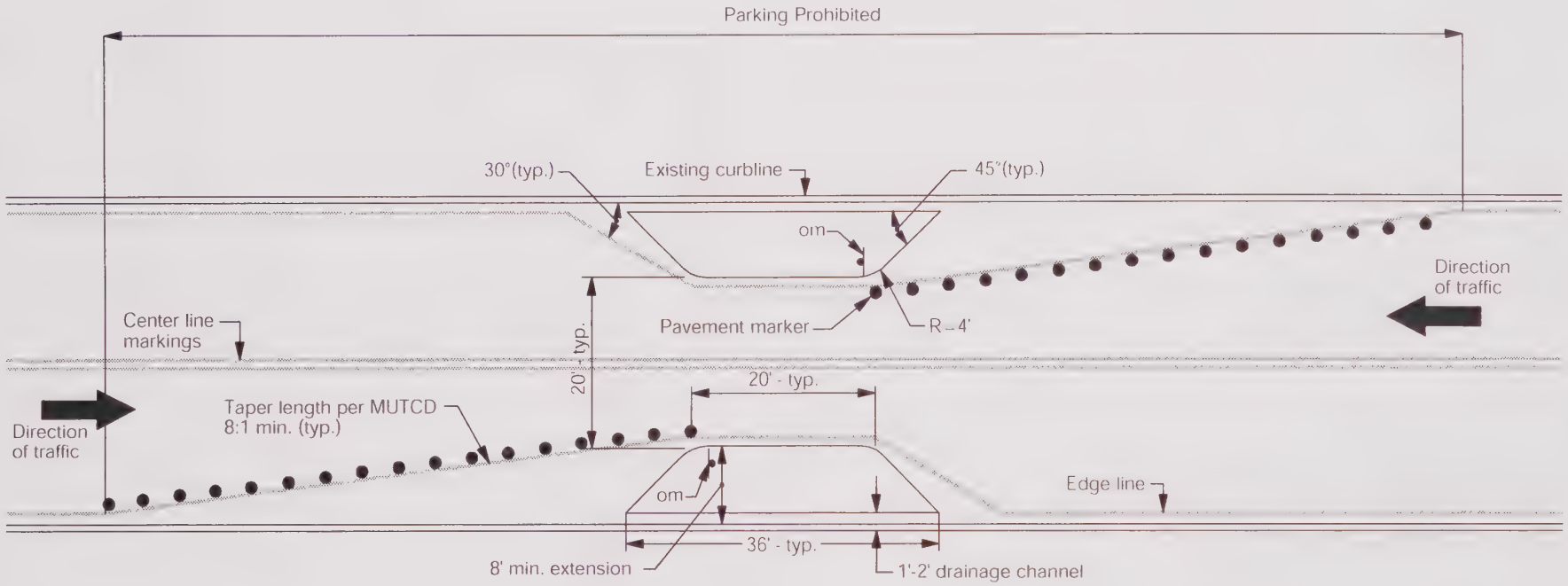
BULBOUT
(INTERSECTION TREATMENT)

FIGURE A-5



CENTER ISLAND NARROWING

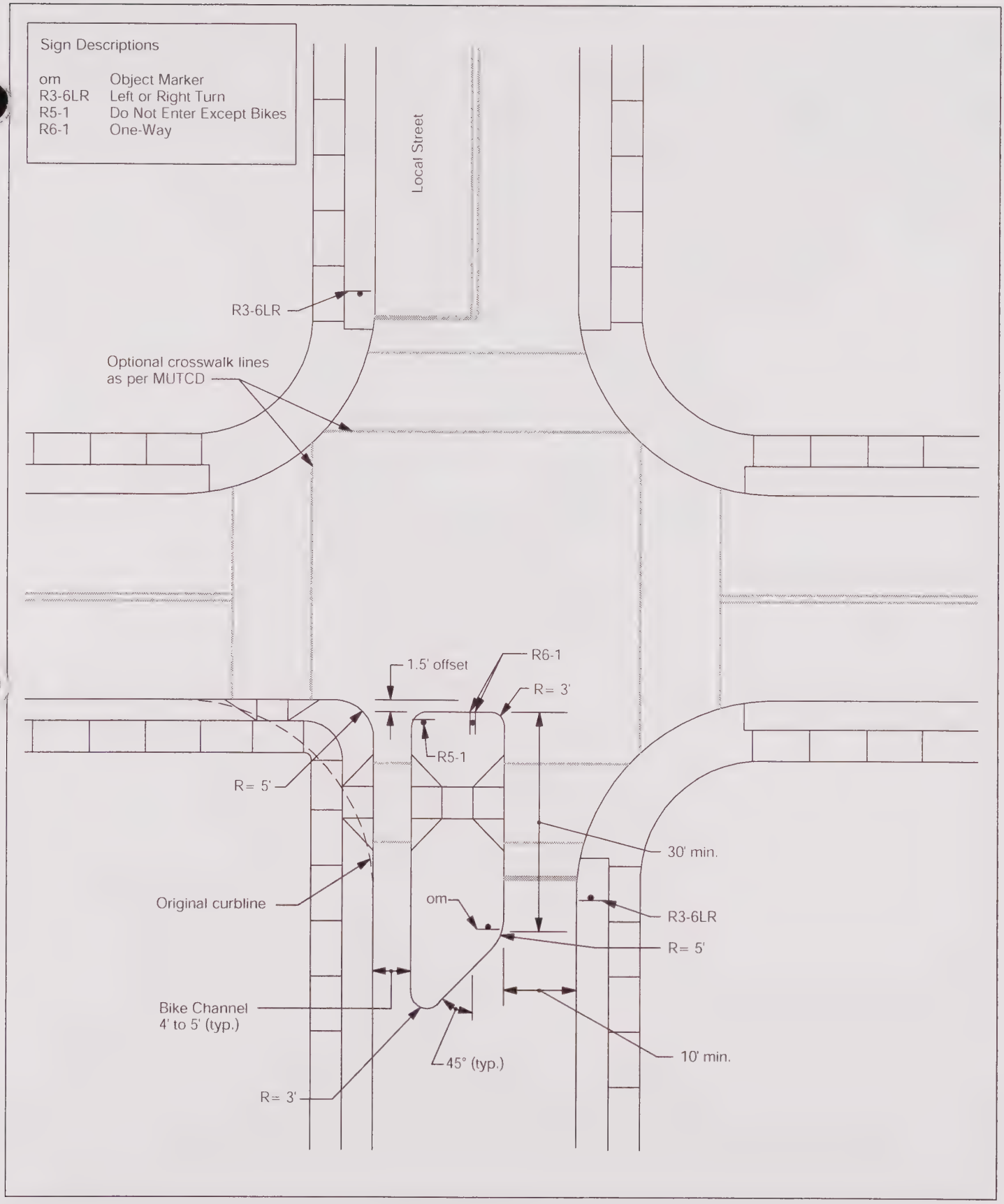
FIGURE A-6



Sign Descriptions	
om	Object Marker

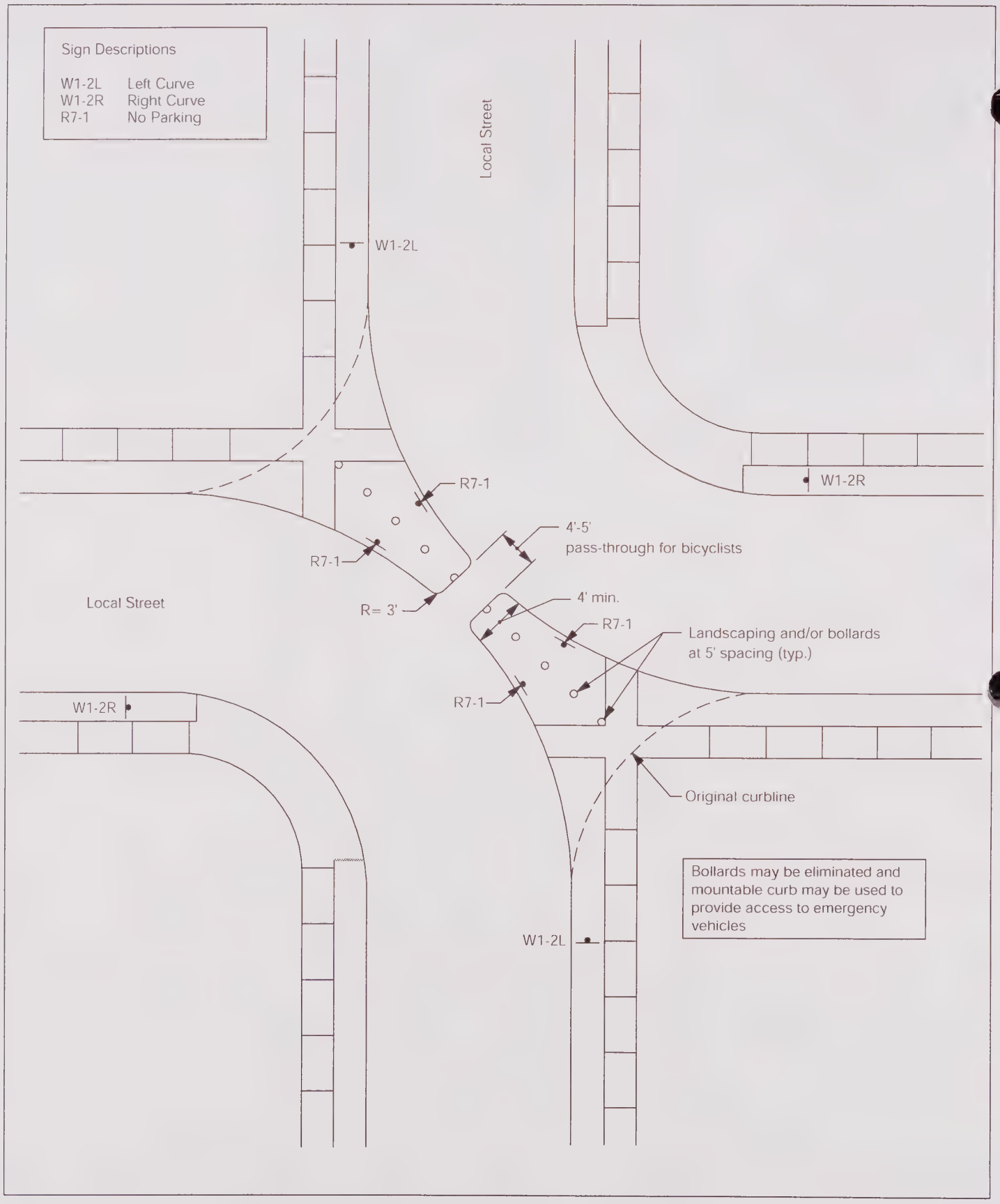
CHOKER

FIGURE A-7



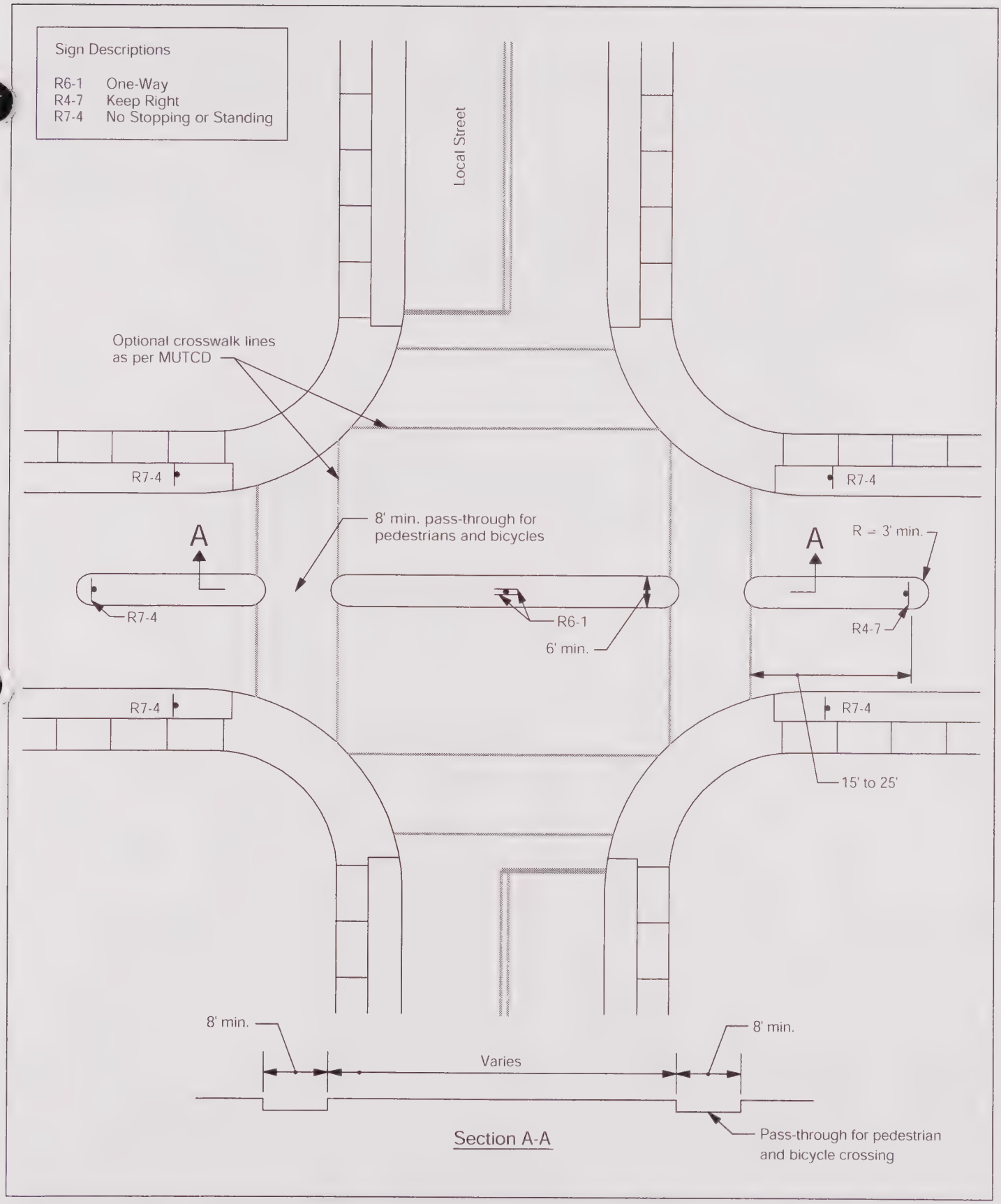
HALF CLOSURE

FIGURE A-8



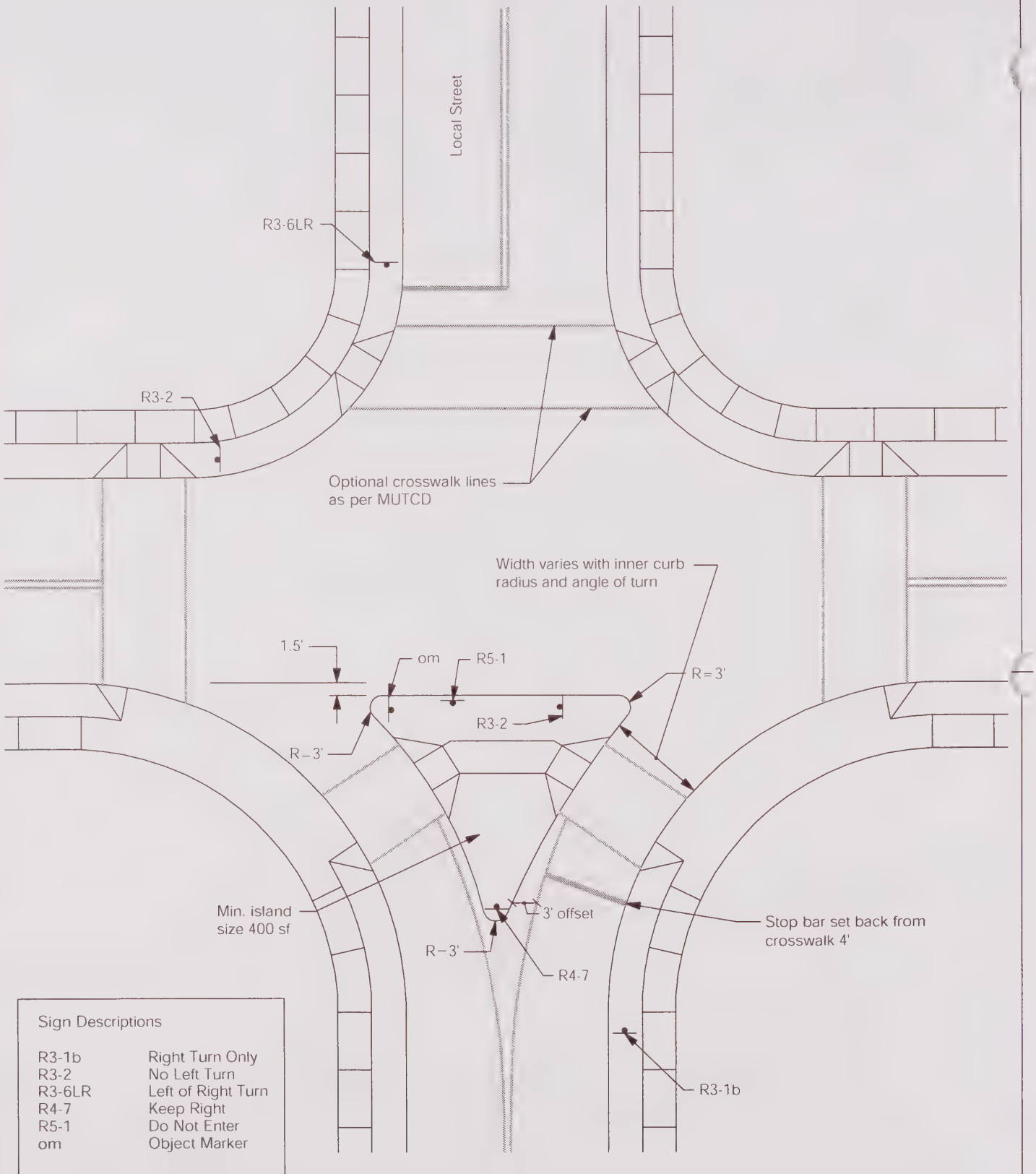
DIAGONAL DIVERTER

FIGURE A-9



MEDIAN BARRIER

FIGURE A-10



FORCED TURN ISLAND

FIGURE A-11

Sign Dimensions	Color Code		
	Background	Message	Border
30" x 30"	Flourescent Yellow or Yellow-Green	Black	Black



TRAFFIC CIRCLE OR ROUNDABOUT



TWO-LANE CHICANE

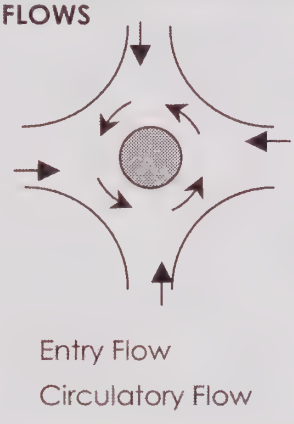
Appendix B
Checking Roundabout Compatibility

When considering a roundabout for a particular intersection, the expected traffic volumes and the available geometry must be taken into consideration, along with several other considerations.

Traffic Volumes

The first check is to determine whether a roundabout could accommodate the traffic volumes at a particular intersection. Two quantities are required: the Maximum Entry Flow and the Maximum Circulatory Flow (see Figure B-1). The Maximum Entry Flow is the traffic volume entering the intersection (including left-turning, through, and right-turning vehicles) at the highest-volume approach. Circulatory Flow is calculated for each quadrant of the circulating lane by adding up the contributing Entry Flows:

FIGURE B-1. TYPES OF ROUNDABOUT TRAFFIC FLOWS



$$V_{EB,circ} = V_{WB,LT} + V_{SB,LT} + V_{SB,TH} + V_{NB,U\text{-}turn} + V_{WB,U\text{-}turn} + V_{SB,U\text{-}turn}$$

$$V_{WB,circ} = V_{EB,LT} + V_{NB,LT} + V_{NB,TH} + V_{SB,U\text{-}turn} + V_{EB,U\text{-}turn} + V_{NB,U\text{-}turn}$$

$$V_{NB,circ} = V_{SB,LT} + V_{EB,LT} + V_{EB,TH} + V_{WB,U\text{-}turn} + V_{SB,U\text{-}turn} + V_{EB,U\text{-}turn}$$

$$V_{SB,circ} = V_{NB,LT} + V_{WB,LT} + V_{WB,TH} + V_{EB,U\text{-}turn} + V_{NB,U\text{-}turn} + V_{WB,U\text{-}turn},$$

where $V_{i,circ}$ = Circulatory flow immediately downstream of approach *i*.

$V_{i,j}$ = Traffic volume at approach *i* taking turning movement *j*;

EB, WB, NB, SB = Eastbound, Westbound, Northbound, and Southbound, respectively; and *LT, TH, U-turn* = Left Turn, Through, and U-Turn, respectively.

After using the above formula to find the circulatory flows, the highest of the four values is used in Figure B-2 in combination with the Maximum Entry Flow to determine whether an Urban Single-Lane Roundabout could accommodate the traffic volume.

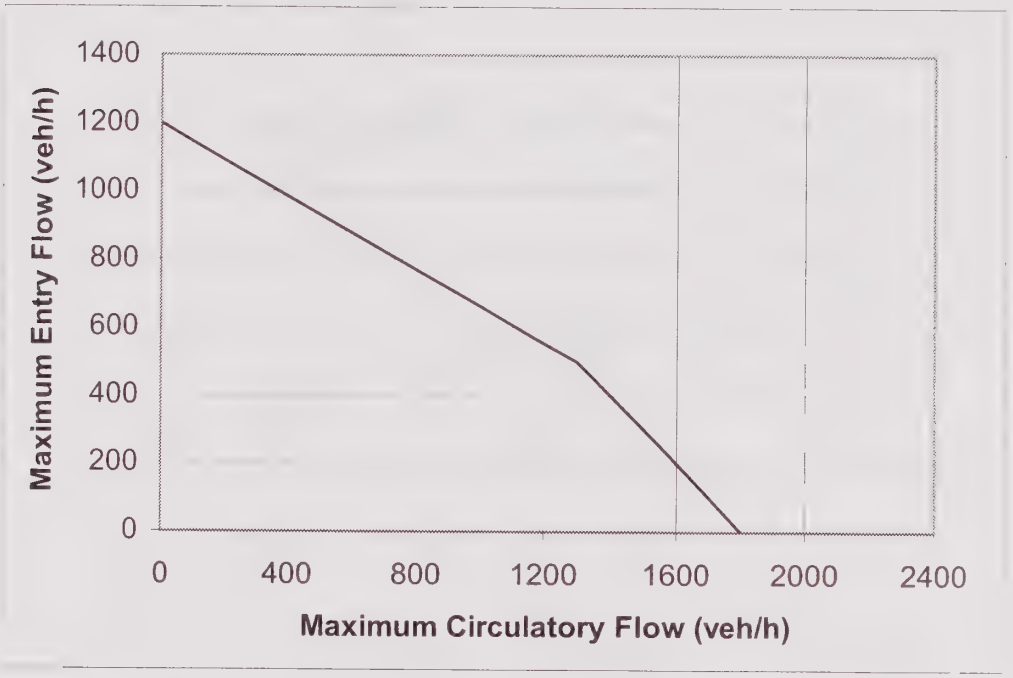


Figure B-2. Approach Capacity of an Urban Single-Lane Roundabout

Geometry

The second check is the available geometry. The width of the approach tapers and the size of the inscribed diameter of a roundabout can vary over a wide range. However, it may be possible to eliminate a roundabout from consideration by comparing the available right-of-way to some minimum geometric values as shown in Drawing 12B of the Standard Plans.

City of Stockton



Pedestrian Safety and Crosswalk Installation Guidelines

November 2003

City of Stockton
Public Works Department
Engineering Division
425 N. El Dorado Street
Stockton, CA 95202

Fehr & Peers
Transportation Consultants

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GLOSSARY

Actuated Signal: A traffic signal or other indication where the phasing is controlled by the direct or indirect actions of the user such as push buttons, or video, inductive loop or other type of detection devices.

Advance Stop Line (ASL): A stop line at an intersection or mid-block crossing placed before a marked crosswalk.

Average Daily Traffic (ADT): The total bi-directional volume of traffic passing through a given point during a 24-hour period.

Approach: This is the portion of an intersection leg used by incoming traffic.

AASHTO: American Association of State Highway and Transportation Officials.

Bulbout: Another term for a curb extension, which protrudes into the street at an intersection or mid-block crossing to reduce the exposure for pedestrians and to reduce vehicular traffic speeds.

Controlled Location: Intersection or mid-block crossing location with a traffic signal or stop sign.

Channelization: This is the separation or regulation of conflicting traffic movements into definite paths of travel by use of pavement markings, raised islands or other suitable means to facilitate the safe and orderly conduct of vehicles and/or pedestrians.

Crosswalk: Portion of roadway where pedestrians are permitted to cross the street; may be marked or unmarked.

CTCDC: California Traffic Control Device Commission.

Curb Extension: See Bulbout.

Curb Radius: The radius of the circle joining the intersecting street curbs at a corner.

Curb Ramp: A combined ramp and landing that accomplishes a change in level at a curb. This element provides street and sidewalk access to pedestrians using wheelchairs.

Cycle Time: Time, in seconds, required for one complete sequence of signal indications for all movements at a given intersection.

Delay: This is the lost time (compared to free flow conditions) for vehicles, pedestrians or bicyclists.

Detectable Warning: A surface specified in the *Americans with Disabilities Act Accessibility Guidelines*, comprised of raised, truncated domes, used to inform pedestrians who are visually impaired, of road and rail vehicle crossings in the area immediately ahead.

85th Percentile Speed: The average speed at which 85 percent of drivers on a particular roadway are traveling.

Exclusive Pedestrian Phase: Signal phase during which only pedestrians are permitted to cross in an intersection and all vehicular signals display red.

FHWA: Federal Highway Administration.

Green Time: This is the length of a green indication for a particular traffic movement.

Island: A defined area between traffic lanes for control of vehicle movements and/or for pedestrian refuge.

Level of Service (LOS): This is a measure of the mobility characteristics of transportation facility. Level of service for vehicles is determined by the delay or the volume/capacity ratio. Pedestrian and bicycle level of service can be quantitative or qualitative, using measures such as connectivity, comfort, accessibility and convenience.

Median: Portion of a divided highway or roadway separating the traveled ways for traffic moving in opposite directions. This may consist of a paved surface, unpaved surface, or raised island that can also serve as a refuge for pedestrians and other non motorized roadway users.

Mid-block Crossing: A crossing point positioned between intersections rather than at an intersection.

Pedestrian: A person who travels on foot, or who uses assistive devices such as a wheelchair, for mobility.

Refuge Island: A median island that is designed to allow pedestrians to cross a street safely.

Scramble Phase: Pedestrians are permitted to cross in all directions at an intersection including diagonally, during an exclusive pedestrian signal phase.

Signal Cycle: One complete sequence of signal indications for all movements at a given intersection.

Signal Progression: Progressive movement of traffic (without stopping) at a planned speed, through signalized locations.

Sight Distance (SD): The length of roadway visible to the driver, bicyclist or pedestrian with an unobstructed line of sight.

SJRTD: San Joaquin Regional Transit District.

Stopping Sight Distance: The distance traveled by a vehicle from the instant a driver of a vehicle sights an object necessitating a stop to where the vehicle is fully stopped, including the time needed to recognize the situation and apply the brakes.

Turning Radius: The minimum path of a turning vehicle at a corner. See also "curb radius."

Traffic Calming Device: A physical measure used to divert or slow traffic.

Uncontrolled Location: Intersection or mid-block crossing without a traffic signal or stop sign.

Volume: The number of vehicles passing a given point during a specified period.

Warrants: Warrants are intended to provide guidance to the transportation professional in evaluating potential safety and operational benefits of installing improvements based on 'average' or 'normal' conditions. Warrants are not a substitute for engineering judgment. The fact that a warrant is met is not conclusive justification for the installations. Reliance exclusively on warrants may fail to provide adequate facilities for pedestrians, especially those with disabilities.

INTRODUCTION



The City of Stockton is developing a Neighborhood Traffic Management Program (NTMP) to develop a process for implementing "traffic calming" measures to address safety concerns, traffic problems and quality-of-life issues related to speeding on neighborhood streets. Additionally, the City is also revising its street design standards to reduce the need to implement traffic calming measures in the future.

This document complements the NTMP and Street Design Standards by providing guidelines for improving pedestrian safety and enhancing pedestrian circulation. A comprehensive pedestrian safety strategy contains a three-pronged approach of engineering, enforcement, and education programs. This document focuses on engineering elements, such as pedestrian crossing treatments and intersection design.

This document describes best practices related to numerous pedestrian treatments, including: pedestrian signals, pedestrian refuge islands, compact intersections, sidewalks, and crosswalks. It includes information about signalized and unsignalized locations, intersection design, and innovative treatments for at-grade crossings. It also includes recommendations for evaluating pedestrian safety as part of the development review process. This document is intended to serve as a reference guide for staff, citizens, and developers when determining the best engineering solutions to pedestrian safety concerns, particularly with regard to the location and design of crosswalks, pedestrian signals, and other elements of pedestrian safety.

Development of pedestrian safety guidelines will guide the City and developers in making decisions about where basic crosswalks (two stripes) can be marked; where crosswalks with special treatments, such as high visibility crosswalks, flashing beacons and other special features, should be employed; and where crosswalks will not be marked due to safety concerns resulting from volume, speed or sight distance issues.

The City currently has a policy of prohibiting new crosswalks at uncontrolled locations (intersections and mid-block locations without a signal or stop sign), unless approved by City Council action. At controlled intersections, the City's current policy is to install crosswalks where there is a demonstrated need.

The *Pedestrian Safety and Crosswalk Installation Guidelines* establish criteria for considering crosswalks at unsignalized or mid-block locations. The guidelines also recommend that crosswalks be installed at all approaches to controlled intersections unless safety or signal-phasing concerns suggest otherwise.

I. FUNCTION OF CROSSWALKS

Well-marked pedestrian crossings accomplish dual goals. They prepare drivers for the likelihood of encountering a pedestrian, and they create an atmosphere of walkability and accessibility for pedestrians. In California, it is legal for pedestrians to cross any street, except at unmarked locations between immediately adjacent signalized crossings or where crossing is expressly prohibited. Marked crossings reinforce the location and legitimacy of a crossing.



Why do cities mark crosswalks?

Crosswalk Function:
- Creating reasonable expectations where pedestrians may cross a roadway
- Predictability of pedestrian actions and movement
- Channelization of pedestrians to designated crossing locations

Advantages of marked crosswalks:
- Help pedestrians find their way across complex intersections
- Designate the shortest path
- Direct pedestrians to locations of best sight distance

Disadvantages of marked crosswalks:
- May create a "false sense of security" for pedestrians
- At uncontrolled locations on multi-lane streets with higher traffic volumes, may result in a greater number of pedestrian collisions if additional enhancements are not provided
- Maintenance is costly

In pedestrian-friendly cities, crossing locations are treated as essential links in the pedestrian network. At mid-block locations, pedestrians cannot cross legally without a marked crosswalk. When there are pedestrian generators in these locations, it may be appropriate to create safe, convenient crossing opportunities. Without mid-block crossing locations, pedestrians face the following three choices: detour to a controlled crossing location; detour to an intersection where it is legal to cross, even if not controlled; or jaywalk (cross illegally).

Steps in identifying candidate locations for crosswalks

The first step in identifying candidate crosswalk locations is to identify the places people would like to walk (pedestrian desire lines) which are affected by local land uses (homes, schools, parks, commercial establishments, etc.) and the location of transit stops. This information forms a basis for identifying pedestrian crossing improvement areas and prioritizing such improvements, thereby creating a convenient, connective and continuous walking environment.

The second step is identifying where it is safest for people to cross. Of all road users, pedestrians have the highest risk because they are the least protected. National statistics indicate that pedestrians represent 14 percent of all traffic incident fatalities while walking accounts for only three percent of total travel trips. Pedestrian collisions occur most often when a pedestrian is attempting to cross the street at an intersection or mid-block location[1].

Several major studies of pedestrian collision rates at marked and unmarked crosswalks have been conducted. In 2002, the Federal Highway Administration (FHWA) published a comprehensive report on the relative safety of marked and unmarked crossings. This document presents a variety of special treatment options to mitigate safety, visibility or operational concerns at specific locations. The flowchart on p. 20 outlines the steps in identifying candidate locations for crosswalks based on the findings of the 2002 FHWA Study described on p. 4-6.

[1] *Pedestrian Crash Types, A 1990's Information Guide*, FHWA; This paper analyzed 5,076 pedestrian crashes that occurred during the early 1990's. Crashes were evenly selected from small, medium, and large communities within six states: California, Florida, Maryland, Minnesota, North Carolina, and Utah.

II. CROSSWALK SAFETY RESEARCH

A study by the City of San Diego in 1970 found that a higher rate of collisions involving pedestrians occurred at uncontrolled locations with marked crosswalks. However, the City of San Diego study, which was widely used by many other cities as a rationale for removing marked crosswalks at uncontrolled locations, fails to differentiate between different types of streets and crossing locations. A separate study conducted on California State highways reached similar conclusions in 1996, but this study was also limited in its applicability to City streets that typically have fewer lanes and carry less traffic volume than State highways.

More recent research conducted by the Federal Highway Administration (FHWA) in 2002 found that on two-lane roads, the presence of a marked crosswalk alone at an uncontrolled location was associated with no difference in pedestrian crash rate, compared to an unmarked crosswalk. On multi-lane roads with higher traffic volumes, having a marked crosswalk alone was associated with a higher pedestrian crash rate compared to an unmarked crosswalk (see p. 4-6 for more information on the findings of the FHWA study). This research may be more relevant for developing a crosswalk policy for the City due to the City's varying street types.[2]

The 2002 FHWA study of pedestrian collisions at marked and unmarked crosswalks is widely recognized as the best resource for determining appropriate locations for marked crosswalks at uncontrolled locations. Very few California cities have crosswalk installation warrants or formal policy. The cities of Palo Alto, Walnut Creek, San Luis Obispo and Sacramento use the 2002 study to guide their crosswalk installation policy.

This study is used because:

- It is extensive - It examined motor vehicle/pedestrian collision rates at a large number of crossing locations not limited by roadway characteristics in 30 different cities

- It is thorough- The collision rates were broken down by roadway characteristics (two-lane and multi-lane roads with various speeds and traffic volumes) in order to give the clearest picture of pedestrian safety at each type of location

The authors of the study note that:

> "When considering marked crosswalks at uncontrolled locations, the question should not simply be: 'Should I provide a marked

[2] Zegeer, Charles V., Stewart, J. Richard, and Huang, Herman, "Safety Effects of Marked vs. Unmarked Crosswalks at Uncontrolled Locations: Executive Summary and Recommended Guidelines, " University of North Carolina Highway Safety Research Center for Federal Highway Administration, February 2002.

crosswalk or not?' Instead, the question should be: 'Is this an appropriate tool for getting pedestrians across the street?' Regardless of whether marked crosswalks are used, there remains the fundamental obligation to get pedestrians safely across the street."[3]

FHWA Study Summary (2002)

Study Objective: To compare pedestrian crash occurrence at marked versus unmarked crosswalks at uncontrolled intersections throughout the U.S.

Data:

- 1,000 marked and 1,000 unmarked crossings
- No school crossings
- Mid-block locations were included
- Crash history (5 years), pedestrian volumes, traffic volumes, number of lanes, speed limit
- 229 pedestrian accidents in the sample

Key findings:

(a) 2-lane roads: No significant difference between marked and unmarked crosswalks

(b) Multi-lane road with Average Daily Traffic (ADT) below 12,000: No significant difference between marked and unmarked crosswalks

(c) Multi-lane road with ADT above 12,000 and no raised median: Marked crosswalks had significantly higher pedestrian crash rates than unmarked crosswalks

(d) Multi-lane road with ADT above 15,000 and with raised median: Marked crosswalks had significantly higher pedestrian crash rates than unmarked crosswalks

(e) Variables having no effect: Area type, mid-block versus intersection, speed limit, one-way versus two-way, crosswalk condition and marking pattern had no effect on the occurrence of pedestrian crashes

(f) Multiple threat crashes: 17.6 percent of the crashes in marked crosswalks were multiple threat crashes (i.e. one vehicle stops for the pedestrian but the driver in the adjacent lane does not see the pedestrian). None occurred in unmarked crosswalks

The table on the following page summarizes the FHWA recommendations for installing marked crosswalks at uncontrolled locations, based on the findings of the 2002 study.

[3] Zegeer et al, opp.cit. p. 1

Table 1. 2002 FHWA recommendations for considering marked crosswalks and other needed pedestrian improvements at uncontrolled locations[a].

	≤ 9,000 ADT			> 9,000 to ≤ 12,000 to			> 12,000 to ≤ 15,000 ADT			> 15,000 ADT		
	≤ 30 mph	35 mph	≥ 40 mph	≤ 30 mph	35 mph	≥ 40 mph	≤ 30 mph	35 mph	≥ 40 mph	≤ 30 mph	35 mph	≥ 40 mph[b]
2 lanes												
3 lanes												
++4 lanes, raised median[c]												
++4 lanes, no median												

Key

Candidate sites for marked crosswalks. Marked crosswalks must be installed carefully and selectively. Before installing new marked crosswalks, an engineering study is needed to determine whether the location is suitable for a marked crosswalk. For an engineering study, a site review may be sufficient at some locations, while a more in-depth study of pedestrian volume, vehicle speed, sight distance, vehicle mix, etc. may be needed at other sites. It is recommended that a minimum of 20 pedestrian crossings per peak hour (or 15 or more elderly and/or child pedestrians) exist at a location before placing a high priority on the installation of a marked crosswalk alone.

Probable candidate sites for marked crosswalks. Potential increase in pedestrian crash risk may occur if marked crosswalks are added without other pedestrian facility enhancements. These locations should be closely monitored and may be considered for enhancements as feasible.

Marked crosswalks alone are insufficient, since pedestrian crash risk may be increased due to providing marked crosswalks alone. Consider using other treatments, such as traffic-calming treatments, traffic signals with pedestrian signals where warranted, or other substantial crossing improvement to improve crossing safety for pedestrians.

a. These guidelines include interestion and midblock locations with no traffic signals or stop signs on the approach to the crossing. They do not apply to school crossings. A two-way center turn lane is not considered a median. Crosswalks should not be installed at locations that could present an increased safety risk to pedestrians, such as where there is poor sight distance, complex or confusing designs, a substantial volume of heavy trucks, or other dangers, without first providing adequate design features and/or traffic control devices. Adding crosswalks alone will not make crossings safer, nor will they necessarily result in more vehicles stopping for pedestrians. Whether or not marked crosswalks are installed, it is important to consider other pedestrian facility enhancements (e.g., raised median, traffic signal, roadway narrowing, enhanced overhead lighting, traffic-calming measures, curb extensions), as needed, to improve the safety of the crossing. These are general recommendations; good engineering judgment should be used in individual cases for deciding where to install crosswalks.

b. Where the posted speed limit or 85th percentile speed exceeds 40 mph, marked crosswalks alone should not be used at uncontrolled locations.

c. The raised median or refuge island must be at least 4 ft. (1.2 m) wide and 6 ft. (1.8 m) long to adequately serve as a refuge area for pedestrians.

III. CONTROLLED LOCATIONS

Best Practices

The following is the recommended, or best practice, for pedestrian treatments in crosswalks at signalized intersections or stop-controlled approaches (i.e., vehicles stop at approach in question).

- **Mark Crosswalks on all approaches** (i.e., legs of the intersection) using standard crosswalk markings or high-visibility markings. Where the accident data or observations of conflicts identify a crosswalk of particular concern, consider special treatments (identified below under "Solutions")

- **Pedestrian signals should be timed for a pedestrian travel speed of 4 feet per second**[4]. If there are special land uses such as senior centers or schools within 100 feet of the intersection, slower walking speeds (3.5 feet per second) may be considered

The following two situations are **exceptions** to the policy of marking crosswalks on all approaches:

- **Crossing locations with heavy right- or left-turn volumes** that occur during the same signal phase as the conflicting pedestrian movement where protected signal phasing for the heavy movement or other solutions are infeasible[5]

- **Intersections with inadequate sight distance**[6] of pedestrians. Elimination of crosswalks in these instances should only occur after other solutions have been deemed infeasible

[4] The current standard of 4 feet per second is based on California Department of Transportation (Caltrans) *Traffic Manual*, 1996. 3.5 feet per second is recommended for pedestrian crossings by the U.S. Department of Transportation, *Designing Sidewalks and Trails for Access, Part II: Best Practices Design Guide*, 2001.

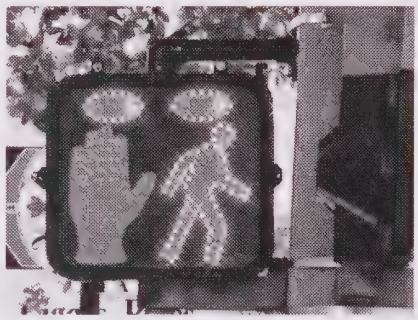
[5] Alternative pedestrian crossings should be identified and it may be necessary to install barrier treatments to reinforce that pedestrian should not cross at the location without a marked crosswalk.

[6] Unrestricted sight distance of pedestrians by motorists should be at least ten times the speed limit (for example, 250 feet for a street with a speed limit of 25 miles per hour).

Special Treatments

There are a number of innovative treatments for pedestrians at signalized intersections, mostly related to pedestrian signals. At locations with high pedestrian volumes and pedestrian-vehicle conflicts, the following measures are means to enhance the safety of pedestrian crossings:

<u>High numbers of turning vehicles</u>



- The **Animated Eye Light Emitting Diode (LED) Signal** is a tool for reminding pedestrians to watch for turning vehicles. It would normally be used at intersections with large numbers of turning vehicles (vehicles turning left or right into the crosswalk)

- **Early Release** or pedestrian lead-time, allows pedestrians to establish themselves in the crosswalk, reducing conflicts between pedestrians and turning vehicles

Special Pavement stencils such as "Pedestrians Look Left" or "Watch Turning Vehicles" stencil are used in Salt Lake City, Halifax, N.S., Canada, and the UK to remind pedestrians to be watchful. These stencils, used in conjunction with special signage, significantly reduced the number of pedestrians not looking for threats at intersections.[7] Additionally, high-visibility crosswalks help channelize pedestrians

- Other special treatments include "**Yield to Pedestrians" signs**, and **reduced corner radii** to slow the speeds of right-turning vehicles. The curb radius should accommodate the expected amount and type of traffic for safe turning speeds. As the curb radius increases, incomplete stops become more frequent and drivers make turns at higher speeds.[8] Recommended ranges for curb radii are contained in the *Street Design Standards* and include: 15 feet for intersecting residential streets (local or collector), 20 feet to 30 feet for non-residential local and collector intersections. For arterial intersections, the City's current standards require a curb radius of 30 feet, except for industrial streets in which a 50-foot radius is required to accommodate a higher volume of truck turning movements

Whenever possible, especially at locations adjacent to pedestrian generators, intersections should be designed **without "free rights"** for vehicles. When "free rights" are necessary, see the figure on p. 25 for the recommended design

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[7] Van Houten, Ron et al, "Special Signs and Pavement Markings Improve Pedestrian Safety," *ITE Journal*, December 1996.

[8] Kulash, William M., <u>Residential Streets</u>, Urban Land Institute, 2001.

High numbers of pedestrians

- **Pedestrian "scramble" phases**, so called because pedestrians have a walk signal in every direction while vehicles have a red light on all approaches. This treatment is appropriate in central business districts where pedestrian volumes are exceptionally high

- **"No Right Turn on Red" restrictions** for vehicles reduce pedestrian-vehicle conflicts at locations with high numbers of pedestrians, but makes vehicle circulation less convenient and may cause traffic diversions. This type of treatment needs to be considered on a case-by-case basis. City policy requires that traffic signal service levels need to remain at acceptable levels

- **Advance stop lines or yield lines** are stop or yield bars placed four feet in advance of the crosswalk. Advance stop lines or yield bars should be considered based on pedestrian volumes, generators and safety concerns relevant to a specific crossing

Wide intersections

- **Countdown signals** are useful at locations with crossing distances greater than 60 feet and pedestrian clearance intervals of greater than 15 seconds or a high pedestrian volume. At wide streets with long clearance intervals, the countdown signal effectively communicates the amount of time left to cross the street. At wide streets with medians, there should be adequate crossing time for the pedestrian to traverse the entire distance and countdown signals should be used as a default

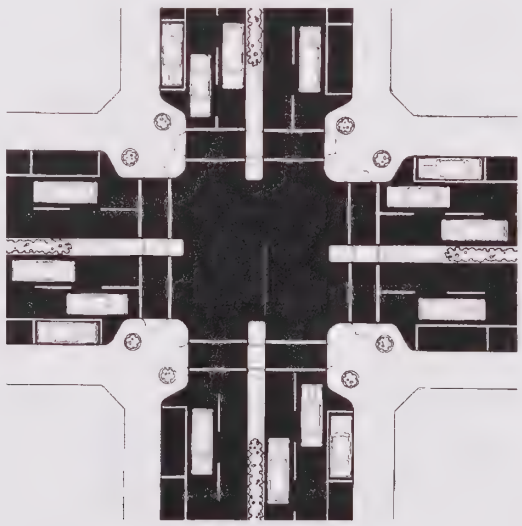


- **Pedestrian Refuge Islands** should extend through the crosswalk, with a curb cut for wheelchair accessibility. Refuge islands should be clear of obstructions and have adequate drainage. They should be at least 12 feet long or the width of the crosswalk (whichever is greater) and 60 feet square. At actuated pedestrian signals, an accessible pedestrian push button should also be located in the median. Recommended refuge island widths are as follows:

Speed	Minimum Width[9]
25-30 mph	5 feet
30-35 mph	6 feet
35-45	8 feet



- **Bulbouts** are appropriate at locations with usable space next to the curb. Consider bulbouts at intersections of three or more lanes. Bulbouts should not extend further than six feet into the street adjacent to parallel parking, or 12 feet adjacent to diagonal parking. At locations with no on-street parking, bulbouts should not impede bicycle travel.



[9] Where bikes are expected to use the crosswalk, medians should be at least six feet wide, the length of an average bike.

Pedestrian actuated signals

At pre-timed signals, pedestrians get the signal to walk on every crossing, in every signal cycle. However, many signals are not pre-timed, meaning vehicles activate them. These signals have pedestrian push-buttons, which pedestrians must push in order to get a walk signal and adequate time to cross the street.

- At locations where pedestrian activation is registered for greater than 75 percent of the peak hour signal cycles, signals could be set to accommodate pedestrian crossings in every peak period cycle

- At locations that are not on a direct path to a generator with low side-street volumes, signals should be partially-actuated, meaning that pedestrians crossing the side streets get a WALK signal on every cycle, but pedestrians crossing the main street must use the pedestrian push button

- At locations that do not satisfy the location warrants above, where peak hour vehicle congestion and high vehicle volumes occur on all approaches, signals should be fully-actuated

When pedestrian push buttons are used, they should be well-marked, visible, and accessible to all pedestrians from a flat surface, consistent with recommendations from the U.S. Department of Transportation's *Designing Sidewalks and Trails for Access*.



IV. UNCONTROLLED LOCATIONS

This section describes best practices for considering the installation of crosswalks at uncontrolled intersections and mid-block locations, safety considerations, and special treatments in locations where special consideration is recommended.

When to Install Crosswalks at Uncontrolled Intersections

The following is the recommended, or best practice, for pedestrian treatments at uncontrolled approaches to intersections that are not controlled by traffic signals or stop signs.[10]

Crossings should be marked where all of the following occur:

- Sufficient demand exists to justify the installation of a crosswalk (see Demand Considerations below)
- The location is 300 feet or more from a controlled crossing location
- The location has sufficient sight distance (sight distance in feet should be greater than 10 times the speed limit), and/or sight distance will be improved prior to crosswalk marking
- Safety considerations do not preclude a crosswalk (see p. 13, Safety Considerations at Uncontrolled Locations)

Demand Consideration: Uncontrolled crossings should be identified as a candidate for marking if there is a demonstrated need for a crosswalk. Need can be demonstrated by:



- 20 pedestrians per hour during the peak hour or 60 pedestrians total for the highest consecutive four-hour period

or:

- The crossing is on a direct route to or from a pedestrian generator, such as a school, library, senior center, shopping center, park, or employment center

[10] The most common crosswalk of this type will be at intersections where a minor side street has a stop sign and a major street is uncontrolled.

When to Install Crosswalks at Mid-Block Locations

Mid-block crossings should be marked where the following occur:

- Sufficient demand exists to justify the installation of a crosswalk (see Demand Considerations below)
- The mid-block location is 300 feet or more from another crossing location (most of the downtown area has blocks that are 300 feet in length)
- The mid-block location has sufficient sight distance (sight distance in feet should be greater than 10 times the speed limit)
- Provision of a crossing would channelize potential jay-walkers to a suitable crossing location
- Safety considerations do not preclude a crosswalk (see below, Safety Considerations at Uncontrolled Locations)

Where mid-block crosswalks are installed, the default design should be the "triple four" or high-visibility pavement treatments. The installation of mid-block crosswalks requires approval of the City Council.

Demand Considerations: Candidate locations for marked pedestrian crossings at mid-block locations should meet one of the following criteria:

- 40 pedestrians during a one-hour period or 25/hour for four consecutive hours
- A pedestrian generator is less than 300 feet away at a location mid-way between signal or stop-controlled intersections, or there are significant pedestrian trip generators on both sides of the street

Safety Considerations at Uncontrolled Locations

The flowchart on p. 20 and corresponding tables on p. 21-24 should be used to determine if special treatments are needed to ensure safe crossing at uncontrolled locations (see below for examples of special treatments). Where safety concerns would continue even with special treatments, pedestrian signal warrants, established in Caltrans' *Traffic Manual*, should be tested to determine whether the crossing warrants a signal. In the event that a signal is determined to be inappropriate, the crosswalk should not be marked.

A crosswalk should not be installed if sight distance in feet is less than ten times the speed limit. For example, if an intersection has an approach speed of 25 miles per hour, the unrestricted view of pedestrians by motorists should be at least 250 feet.

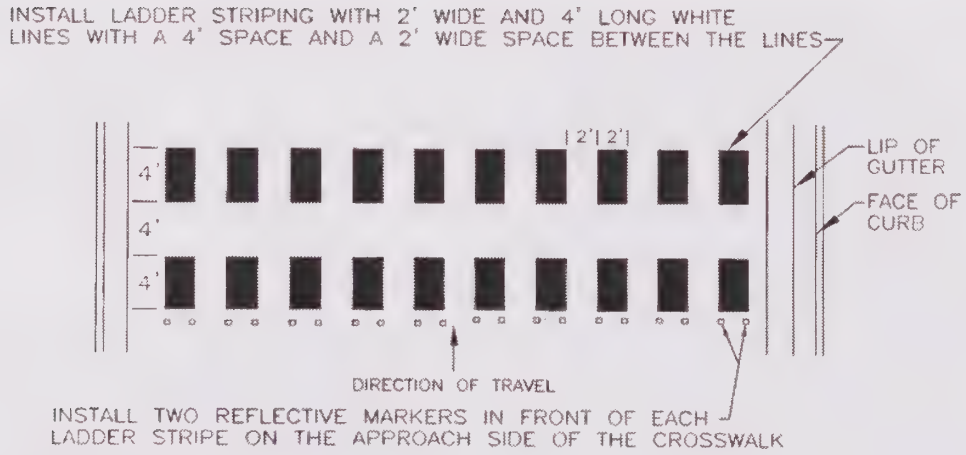
Special Treatments for Uncontrolled Locations

Where marking a crosswalk is deemed appropriate at an uncontrolled crossing location on either a multi-lane street (three or more lanes) or on two-lane streets with ADT greater than 12,000 or where the posted speed limit exceeds 30 miles per hour then the crossing should be a high-visibility style.

One type of high-visibility crosswalk is the "triple-four," which is shown at right and below. Other high visibility crosswalks include the textured pavement crosswalk, the "ladder," and the "broken ladder." The use of textured crosswalks should be selective due to higher maintenance costs.



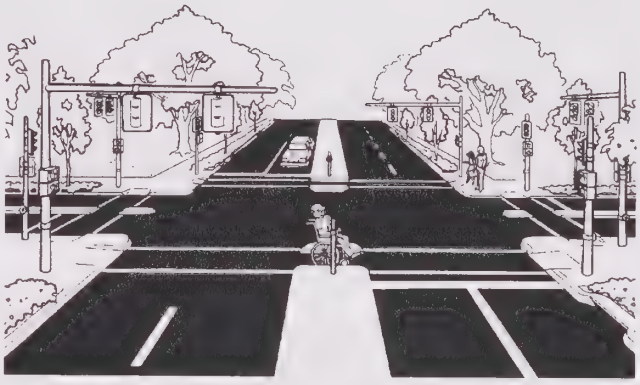
"Triple Four" crosswalk



Additional special treatments can be considered at areas with heightened safety concerns. See pages 20-24 for guidance on choosing crosswalk treatments for different street types, with crosswalk treatments chosen from level one, two and three devices outlined below:

LEVEL ONE

- **Median installation** - On multi-lane streets with ADT of less than 15,000 and 85th percentile speeds[11] of less than 35 miles per hour, the FHWA research described earlier in this report concludes that provision of a median can address safety concerns.



- **Split Pedestrian Crossover (SPXO)** – The SPXO is a pedestrian refuge that channels pedestrians, using railings, to cross one half of the street; enter the island at one end; walk towards the flow of traffic; and exit at the other end to cross the second half of the street. SPXOs can improve pedestrian safety on streets with ADTs below 45,000, with advance yield markings (triangles 16 inches wide by 24 inches long separated by 9 inches located 30 to 50 feet in advance of the crossing), "Yield to Pedestrians" signage, and good visibility, especially at night. This special treatment is primarily used at mid-block locations.



[11] Indicates that 85 percent of motorists on a given road are traveling at 35 miles per hour or less.

- **Bulbouts (intersection crossing)** – Each corner of the intersection is extended into the intersection by approximately seven to eight feet to shorten the crossing distance for pedestrians and raise their visibility to motorists.



- **Bulbouts (mid-block crossing)** – Curbs are extended into the street by approximately seven to eight feet to shorten the crossing distance for pedestrians and raise their visibility to motorists.



LEVEL TWO

- **Overhead signs and flashing beacons** – Various signs showing the universal pedestrian symbol, including both standard yellow, fluorescent yellow, and LED displays, hang from a mast arm that extends over the street.



- **In-pavement flashers** – Installed with a flashing sign at the crosswalk and advanced flashing sign (such as shown on the right, on El Dorado Street in downtown Stockton). Installed with audible warning, advance signs, rumble strips, and single sided indication, per CTCDC requirements.



LEVEL THREE

- **Pedestrian- actuated signal** at locations where pedestrian volumes warrant a signal.



Trail Crossings

At locations where a multi-use trail crosses a street, the location of the crossing (mid-block or intersection) should determine what type of safety considerations are used to determine whether or not to mark a crosswalk.

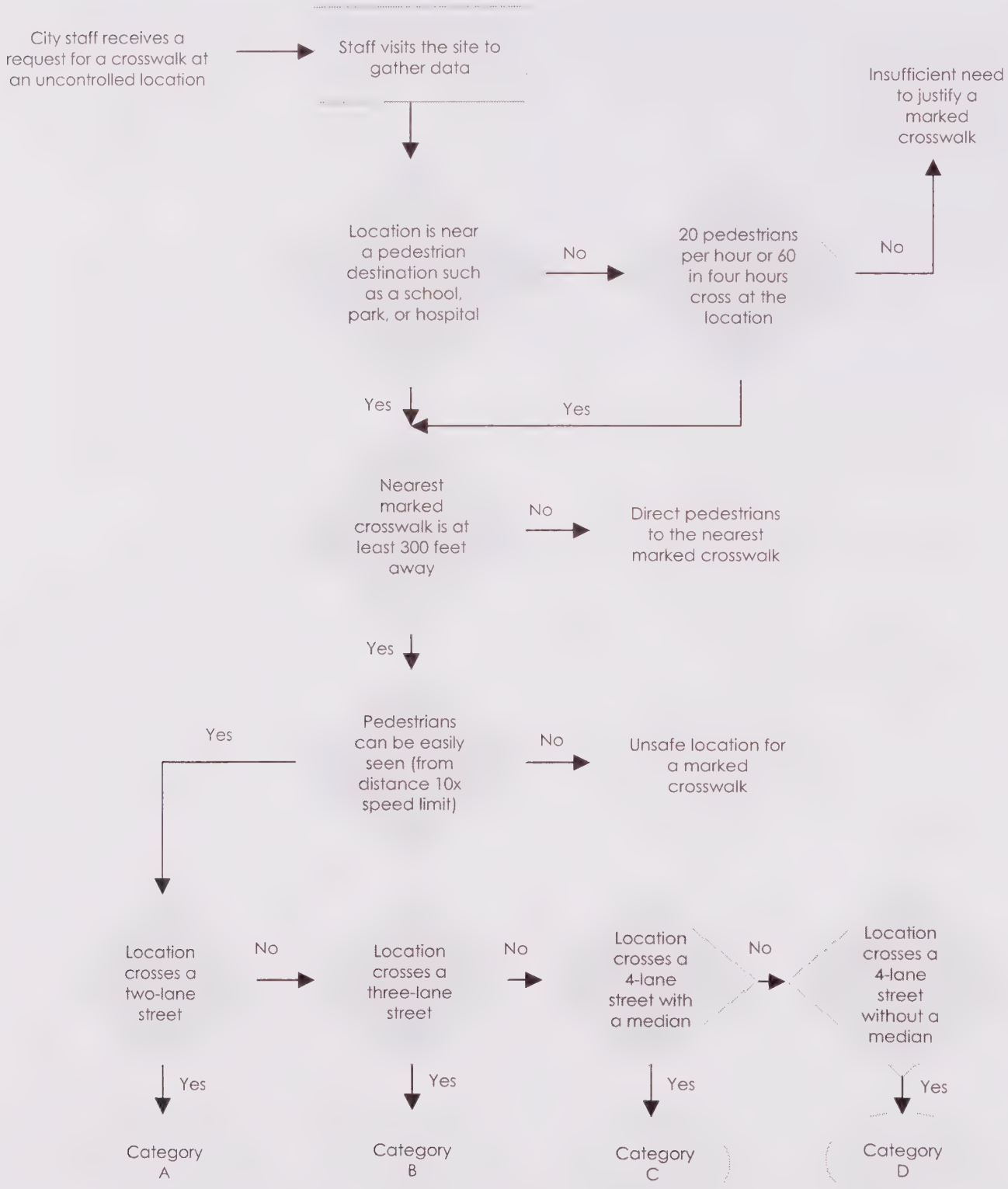
Trail crossings should be well-lit and well-signed. At all uncontrolled at-grade trail crossings, traffic calming and signage within 150 to 200 feet of the crossing should be considered. Warning signs should be installed within 30 to 50 feet of the crossing.

If the crossing does not meet the demand or safety considerations for installation of a marked crosswalk and the nearest signalized crossing location is: 300 feet or more away on an arterial street; 200 feet or more away on a collector street; or 100 feet or more away on a local street, signage and landscaping should be used to direct both cyclists and pedestrians to the adjacent signalized crossing. However, if the nearest signalized crossing is greater than 150 feet away and the location does not meet safety considerations for a marked crosswalk, and other at-grade treatments are infeasible, a grade-separated bicycle-pedestrian crossing should be considered.

Choosing the Right Treatment for Crosswalks at Uncontrolled Locations

The flowchart on p. 20 and corresponding tables on p. 21-24 provide guidelines for choosing appropriate treatment options for pedestrian crossings at uncontrolled locations, based on number of travel lanes, average daily traffic (ADT) and other factors.

CROSSWALK PLACEMENT FLOWCHART FOR UNCONTROLLED LOCATIONS



The following charts summarize the type of crossing treatments appropriate for uncontrolled crossing locations within each category.

CATEGORY A: TWO LANE STREETS

Number of Cars (average daily traffic)	Posted Speed 30 miles per hour or less	35 miles per hour	40 miles per hour or more
9,000 cars or fewer per day	Standard crosswalk	High visibility crosswalk (see p. 14)	High visibility crosswalk (see p. 14) plus a pedestrian refuge, overhead flashing beacons, or other Level 1 and 2 devices (see p. 15-17)
9,000-12,000 cars per day			
12,000-15,000 cars per day	High visibility crosswalk (see p. 14)		
15,000 cars or more per day		High visibility crosswalk (see p. 14) plus a pedestrian refuge, overhead flashing beacons, or other Level 1 and 2 devices (see p. 15-17)	Pedestrian signal (Level 3 device, p. 18) or bridge

CATEGORY B: TWELVE-LANE STREETS[12]

Number of Cars (average daily traffic)	Posted Speed 30 miles per hour or less	35 miles per hour	40 miles per hour or more
9,000 cars or fewer per day	High visibility crosswalk (see p. 14)	High visibility crosswalk (see p. 14)	High visibility crosswalk (see p. 14) plus a pedestrian refuge, overhead flashing beacons, or other Level 1 and 2 devices (see p. 15-17)
9,000-12,000 cars per day		High visibility crosswalk (see p. 14) plus a pedestrian refuge, overhead flashing beacons, or other Level 1 and 2 devices (see p. 15-17)	
12,000-15,000 cars per day	High visibility crosswalk (see p. 14) plus a pedestrian refuge, overhead flashing beacons, or other Level 1 and 2 devices (see p. 15-17)		Pedestrian signal (Level 3 device, p. 18) or bridge
15,000 cars or more per day		Pedestrian signal (Level 3 device, p. 18) or bridge	

[12] Refers to streets with one lane in each direction and a center two-way left-turn lane.

Number of Cars (average daily traffic)	Posted Speed 30 miles per hour or less	35 miles per hour	40 miles per hour or more
9,000 cars or fewer per day	High visibility crosswalk (see p. 14)	High visibility crosswalk (see p. 14)	High visibility crosswalk (see p. 14) plus a pedestrian refuge, overhead flashing beacons, or other Level 1 and 2 devices (see p. 15-17)
9,000-12,000 cars per day		High visibility crosswalk (see p. 14) plus a pedestrian refuge, overhead flashing beacons, or other Level 1 and 2 devices (see p. 15-17)	Pedestrian signal (Level 3 device, p. 18) or bridge
12,000-15,000 cars per day	High visibility crosswalk (see p. 14) plus a pedestrian refuge, overhead flashing beacons, or other Level 1 and 2 devices (see p. 15-17)		
15,000 cars or more per day	Pedestrian signal (Level 3 device, p. 18) or bridge	Pedestrian signal (Level 3 device, p. 18) or bridge	

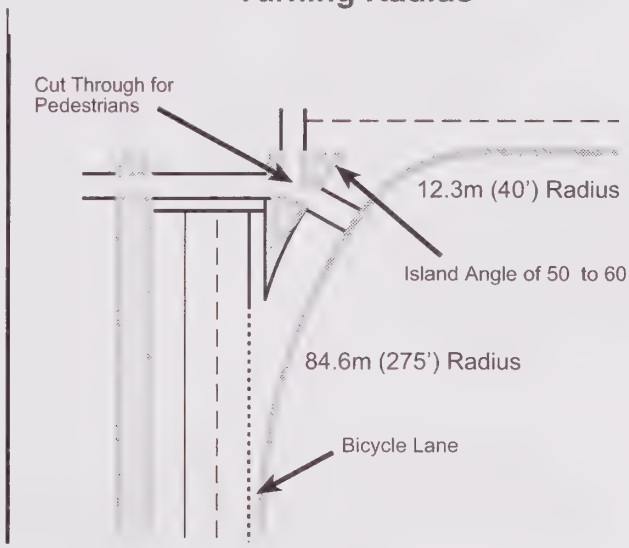
Number of Cars (average daily traffic)	Posted Speed 30 miles per hour or less	35 miles per hour	40 miles per hour or more
9,000 cars or fewer per day	High visibility crosswalk (see p. 14)	High visibility crosswalk (see p. 14) plus a pedestrian refuge or other Level 1 device (see p. 15-16)	High visibility crosswalk (see p. 14) plus a pedestrian refuge, overhead flashing beacons, or other Level 1 and 2 devices (see p. 15-17)
9,000-12,000 cars per day	High visibility crosswalk (see p. 14) plus a pedestrian refuge or other Level 1 device (see p. 15-16)	High visibility crosswalk (see p. 14) plus a pedestrian refuge, overhead flashing beacons, or other Level 1 and 2 devices (see p. 15-17)	Pedestrian signal (Level 3 device, p. 18) or pedestrian bridge
12,000-15,000 cars per day	High visibility crosswalk (see p. 14) plus a pedestrian refuge, overhead flashing beacons, or other Level 1 and 2 devices (see p. 15-17)		
15,000 cars or more per day	Pedestrian signal (Level 3 device, p. 18) or pedestrian bridge	Pedestrian signal (Level 3 device, p. 18) or pedestrian bridge	

V. COMPACT INTERSECTION DESIGN

"Never design more than you need" is the maxim underlying pedestrian-friendly intersections. Compact intersections, where pedestrian crossing distances are minimized and pedestrian visibility is enhanced, are the most accessible, safe, and effective for pedestrians. There are several elements to consider when evaluating an intersection for pedestrian friendliness:

- **Turning Radius:** Whenever possible, especially at locations adjacent to pedestrian generators, intersections should be designed with tight corner radii and without "free rights" for vehicles. When "free rights" are necessary, the turning radius should follow the figure at right. Bulbouts can help retrofit existing inter-sections – reducing corner radii and crossing distances, and raising pedestrian visibility. The San Joaquin Regional Transit District (SJRTD) should be consulted to determine the minimum turning radius to allow buses to make the turn.

Turning Radius



- **Refuge Islands:** Where refuge islands are included, the tip of the island should extend through the crosswalk, with a curb cut for accessibility. Refuge islands should be clear of obstructions and have adequate drainage. They should be at least 12 feet long or the width of the crosswalk (whichever is greater) and 60 feet square. Recommended refuge island widths are as follows:

Speed	Minimum Width
25-30 mph	5 feet
30-35 mph	6 feet
35-45	8 feet

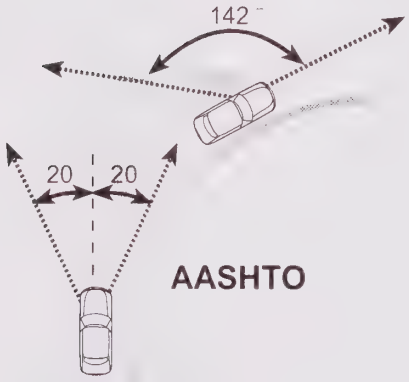
Signal Visibility: Pedestrian signal heads should be located for maximum visibility.

- **Miscellaneous:** Signalized intersections should be well-lit, with pedestrian signals at each crosswalk.

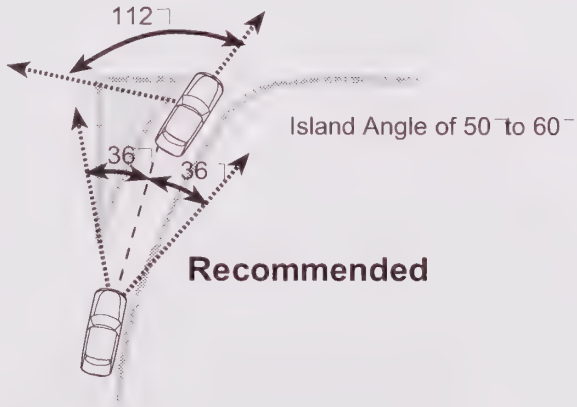


Right-turn slip lane design options are presented below: the AASHTO (American Association of State Highway Transportation Officials) design is shown on the left, while a recommended design to benefit pedestrian circulation by shortening crossing distances and increasing driver sight lines is shown on the right.

Right-Turn Slip Lane Design Options



High Speed
Low Visibility
Head Turner



14 to 18 mph
Good Visibility

VI. SIDEWALKS AND CURB RAMPS

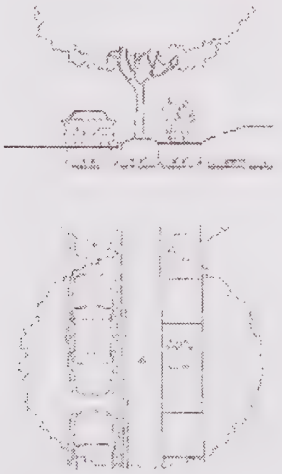
Sidewalks

Sidewalks are the primary circulation routes for pedestrians. Pedestrian-friendly neighborhood street design improves the safety of the walking environment, fosters trips made on foot, and facilitates better access to transit service provided in the community. The City's street standards contain guidance on the placement of sidewalks. Key recommendations are summarized below.

- Install **continuous sidewalks, separated from the roadway by a planter or park strip with a vertical curb** along all new streets next to commercial or residential land uses. Recent research from the FHWA indicates that basic elements such as continuous, separated sidewalk may reduce "walking along roadway" pedestrian/vehicle crashes.[13]

- Follow **block-length recommendations** included in the City's *Traffic Calming Guidelines:*

  > "Some street networks leave excessively long blocks without interrupting intersections. Drivers that travel a long distance (600 feet or greater) without being required to slow or stop by traffic control devices can tend to travel at excessive speeds. To minimize this effect, the street network can be designed such that street blocks are interrupted by streets of sufficient traffic volumes to warrant a traffic control device (e.g. a traffic circle or stop sign) on the street of concern."

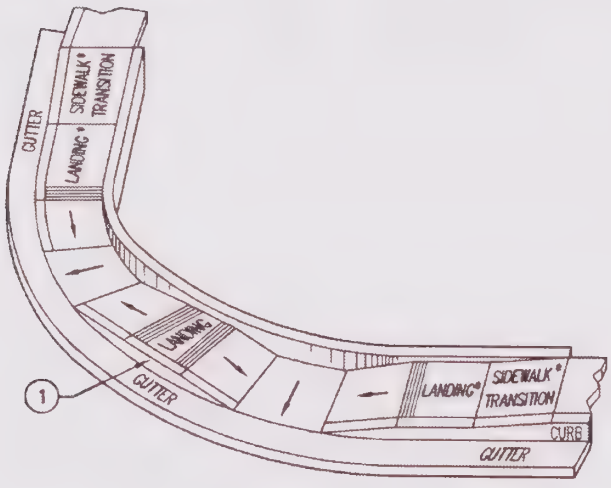


Continuous sidewalks, separated by a planter or park strip with a vertical curb, create a pedestrian-friendly environment.

[13] McMahon, Patrick et al, "An Analysis of Factors Contributing to 'Walking Along Roadway' Crashes: Research Study and Guidelines for Sidewalks and Walkways," Report No. FHWA-RD-01-101.

Curb Ramps

The City maintains definitions and standards for curb ramp installation on City streets. Curb ramps provide street and sidewalk access to pedestrians using wheelchairs. The current standards require a single curb ramp at each corner. Dual ramps, as shown below, may be provided as right-of-way and crosswalks allow. Dual ramps are desirable to direct pedestrians to the correct alignment of the crosswalk, and where feasible, opposing curb ramps should align.



VII. DEVELOPMENT REVIEW

Traffic Impact Studies and plan checks conducted by cities to review private development proposals have not traditionally incorporated measures of pedestrian safety or convenience. This report recommends that pedestrian safety impacts be evaluated during the development review process. The following are basic guidelines that could be included in Transportation Impact Studies:

- **Impact on the existing pedestrian system**
  Will the project change the width, routing, or conditions of an existing pedestrian facility?

- **Pedestrian travel patterns and access**
  Will the project alter existing pedestrian travel patterns and/or otherwise affect a pedestrian's ability to travel as directly as possible from origin to destination with no circuitous travel, due to any change to the sidewalk or pathway network?

- **Pedestrian circulation and access**
  Will the project reduce or restrict a pedestrian's access to any roadway or site, by decreasing safety, increasing the stress, or increasing the delay experienced by the pedestrian? This includes but is not limited to increasing the width of the road or reducing the width of the shoulder, bridge, overpass or underpass.[14]

- **Safety of Operations**
  Does the project meet or exceed accepted design standards and guidelines, as promulgated by responsible agencies such as the State of California or AASHTO? How will the project enhance and/or improve safety and connectivity for pedestrians?

- **Internal Pedestrian Circulation**
  Applicants should submit an internal pedestrian circulation plan (for all non-residential proposals) in order to facilitate the safest, smoothest transition from sidewalk or parking lot to building entrance. The circulation plan should include clearly marked walkways for pedestrians, delineated by textured or colored pavement or pavement stencils. In large parking lots, a continuous sidewalk should be provided in parking lot medians from the parking lot to a marked crossing to the building entrance. All new public buildings, meaning buildings that the public may use, such as shopping centers, should

[14] Pedestrians' stress levels can be quantitatively measured using Pedestrian Level of Service methodology. The PLOS is a spreadsheet with inputs for roadway width, traffic levels, posted speed, sidewalk width, and the presence and measurements of pedestrian buffers (including street trees).

have at least one main entrance immediately adjacent to the sidewalk.

- **Access to Transit**

The Regional Transit district should be consulted during the development review process with regard to the location of transit stops and the installation of pedestrian paths and crossings to facilitate access to existing or new transit stops. Will the project restrict or enhance access to transit service currently provided or to future transit service planned?

Developer Education Program

In order to raise developer awareness about the benefits of pedestrian safety measures, both to pedestrians and to homeowners, this report recommends the development of a brief brochure detailing the guidelines in this report. Staff could distribute the brochures during the application process to educate builders about the City's recommendations pertaining to pedestrian safety measures.

City of Stockton



Street Design Guidelines

November 2003

City of Stockton
Public Works Department
Engineering Division
425 N. El Dorado Street
Stockton, CA 95202

Fehr & Peers
Transportation Consultants

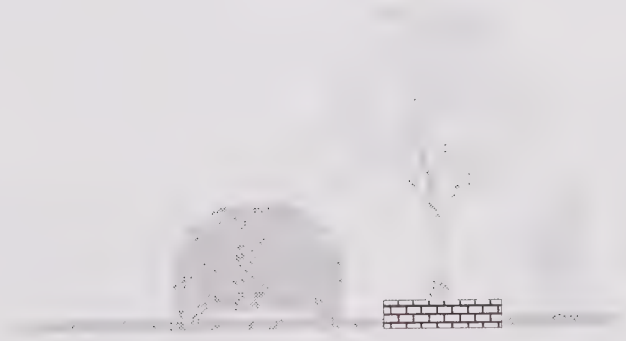


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I. INTRODUCTION



This document describes proposed changes to the City of Stockton design standards for new streets. Changes would include reduced roadway widths for new neighborhood streets, the introduction of landscape strips between the curb and sidewalk for many new streets, and requirements for round-abouts and traffic circles at many new intersections. Intersection treatments that facilitate safe and convenient pedestrian crossing distances are included. Additionally, City staff has included provisions that would establish sidewalk bicycle paths along new arterial and collector streets.

A workshop was held on January 24, 2003, to establish the parameters that form the basis for this document. The workshop was attended by City staff from Public Works, Parks and Recreation, Community Development, Fire and Police, and representatives from San Joaquin Regional Transit. Desirable street elements were discussed and defined, and preliminary standards were determined with regard to street classifications, street width, landscape strips, sidewalks and block length.

Following review of the draft street design standards and input from the development, contracting and engineering community, the proposed street design standards will be considered for adoption.

The purpose of the proposed street standard revisions is to:

- Improve the function and appearance of new streets
- Encourage pedestrian and bicycle travel
- Reduce the potential for speeding and other concerns associated with wider streets, which frequently result in requests for "traffic calming" measures in existing neighborhoods

- Introduce desirable design elements, such as landscaped strips and detached sidewalks that are commonly found in older residential neighborhoods

- Encourage shorter blocks in new development. Longer block lengths, particularly blocks that exceed 600 feet in length, tend to encourage higher travel speeds

The City of Stockton is currently developing *Traffic Calming Guidelines* to define a process for implementing "traffic calming" measures to address safety concerns, traffic problems and quality-of-life issues related to speeding on neighborhood streets. The proposed revisions to the street design standards arose in part to reduce the need to implement traffic calming measures in the future.

Key elements of the proposed revisions to the street design standards are as follows:

- The minimum width of local residential streets would be reduced to 30-32 feet depending on the expected traffic volume. Current standards require 34-36 feet
- Landscape strips, separating the curb from the sidewalk, would be required on most new streets, and raised landscaped medians would be required on new arterial streets
- Maximum block length would be reduced to 600 feet for low-volume residential streets, 800 feet for medium-volume residential streets and non-residential local streets, and 1,000 feet for collector streets
- Bulbouts (curb extensions) would be encouraged at intersections to reduce the crossing distance for pedestrians and discourage speeding through intersections
- Roundabouts at many new collector street intersections, to reduce the need for stop signs and traffic signals
- Traffic circles at many new local street intersections and at intersections of residential collector and local streets
- Wider sidewalks would accommodate bicyclists along many new arterial and collector streets

II. EXISTING STANDARDS

The existing street design standards for the City of Stockton are summarized on Table 1. As is the case with standards adopted in many cities, these standards are characterized by their lack of flexibility in applying width, treatment and design requirements to streets that may carry different traffic volumes and serve different needs. For example, a quiet residential street carrying a relatively low volume of traffic is required to have a width similar to a busier street serving higher intensity land uses.

Traffic engineers and planners have traditionally defined street systems as a functional hierarchy consisting of three basic types[1]:

- ***Arterial Streets*** – These are either relatively high speed/high capacity roads that provide access to regional transportation facilities and serve relatively long trips, or medium speed/medium capacity roads for intra-community travel, as well as access to the rest of the county-wide arterial highway system. Access to arterials should be via collector roads and local streets

- ***Collector Streets*** – A collector is a relatively medium speed/medium volume street, typically two lanes, for circulation within and between neighborhoods. These roads serve relatively short trips and are meant to collect trips from local streets and distribute them to the arterial network

- ***Local Streets*** – These are low speed/low volume roadways that provide direct access to abutting land uses. Driveways to individual units, on-street parking and pedestrian access are usually allowed

Standards for the design or operation of each street within a roadway network are typically derived from its functional classification. These standards affect lane width, intersection and signal spacing, travel speed, volume and local access (such as whether or not driveway access or on-street parking is allowed). The provision of pedestrian, bicycle or transit amenities may also be dependent upon a particular street's functional classification.

[1] Freeways and expressways are sometimes included as a separate classification in a functional classification system.

Key concerns regarding the existing standards that caused the need for new standards include:

- Wide streets, especially in residential areas, which often results in increased travel speeds for motor vehicles (see page 8)

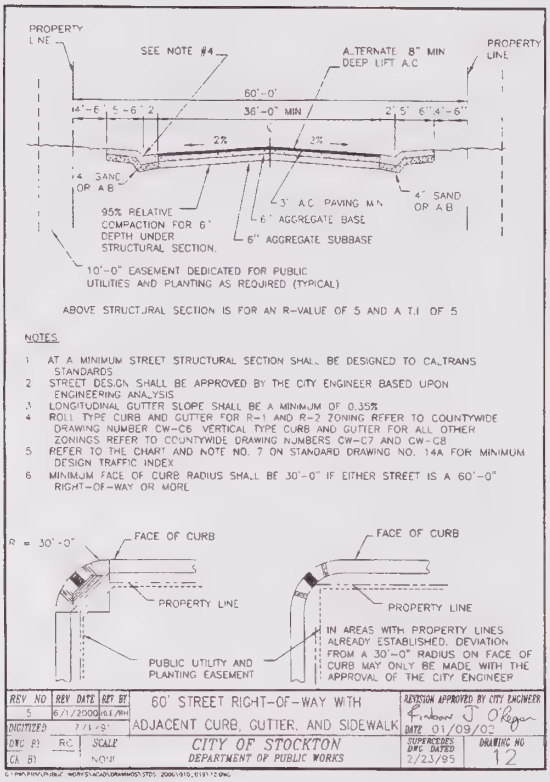
- Long blocks that increase travel distances and result in increased travel speeds (see page 9)

- Lack of design amenities such as landscape strips between curbs and sidewalks that can the appearance of streets and benefit pedestrians (see page 10)

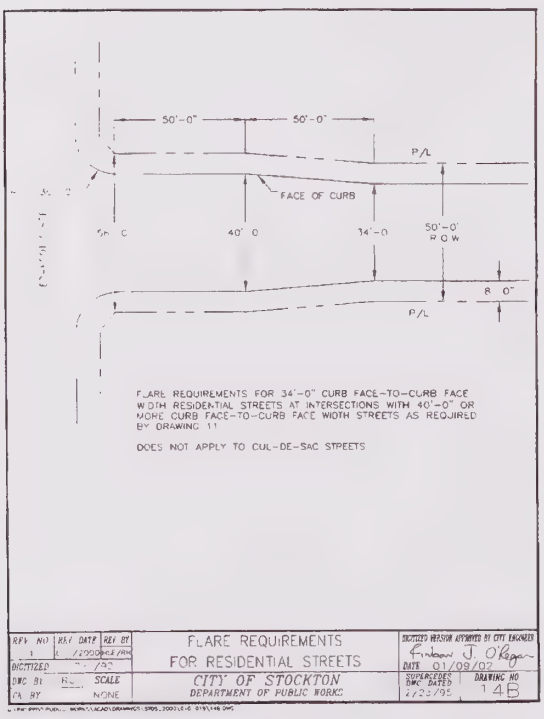
Table 1: Existing Standards

Street Type	Scenario	Curb-to-Curb Width (feet)	Planter Strip	Bike Lanes	Parking	Median	ROW (feet)
Local	Low Volume	34 / 36 [2]	No	No	Yes	No	50
	Medium Volume	36	No	No	Yes	No	60
	Non-residential	44	No	No	Yes	No	64
Collector	----------	40-64	Optional (4')	No	Yes	No	60-84
Arterial	Minor	64-90	No	(Allowed)	No	No	84-110
	Major	114	No	(Allowed)	No	Yes (16')	134

[2] Existing standard width for low-volume residential streets includes three-foot wide rolled curb.



The City's existing street standards do not require landscape strips or detached sidewalks.



Existing standards include "flare requirements" for many intersections that facilitate traffic flow but result in longer crossing distances for pedestrians.

III. STREET DESIGN CONCEPTS

A key goal in considering the development of revised standards is the emerging concept in street design that has resulted in many cities revising their standards to allow narrower streets and require or encourage design elements that are common in older neighborhoods, such as shorter blocks, a grid pattern of streets instead of cul-de-sacs, landscape strips and detached sidewalks. These concepts and relevant research are discussed in the following pages.





Conventional street design standards often result in wide streets with minimal landscaping and an inhospitable pedestrian environment.

Street Width

It is frequently assumed that narrower streets result in slower travel speeds. This assumption has been supported by research conducted in the City of Longmont, Colorado. Longmont has a population of 72,000 people. Approximately 20,000 police accident reports were reviewed to evaluate the impact of street design in contributing to accidents. The most significant relationship between injury accidents and street design was found with regard to street width and curvature. As street widths widen, accidents per mile increase exponentially.[3]

Additional research has found that[4]:

- Wider streets experience higher average and 85th percentile speeds than narrow streets

- On-street parking significantly affects speeds. On-street parking on both sides of the street defines the "effective" width of the street. High parking densities on narrow streets can dramatically reduce travel speeds. Narrow streets with low parking density have an effective width similar to wide streets with no high parking density. Narrow streets with high parking density have the highest "traffic calming" effect

- Residents' perception of the impact of traffic on quality of life correlate highly with speeds. Where speeds are high, residents are more likely to perceive a degraded quality of life

3 Peter Swift, "Residential Street Typology and Injury Accident Frequency" , 2003

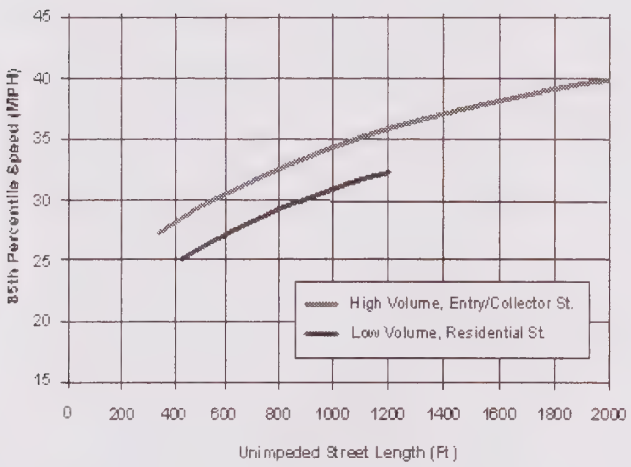
4 James Daisa and John Peers, Fehr & Peer, "Narrow Residential Streets: Do They Really Slow Down Speeds", 1997; and Matthew Ridgway, Fehr & Peers, "Residential Streets – Quality of Life Assessment", 1997

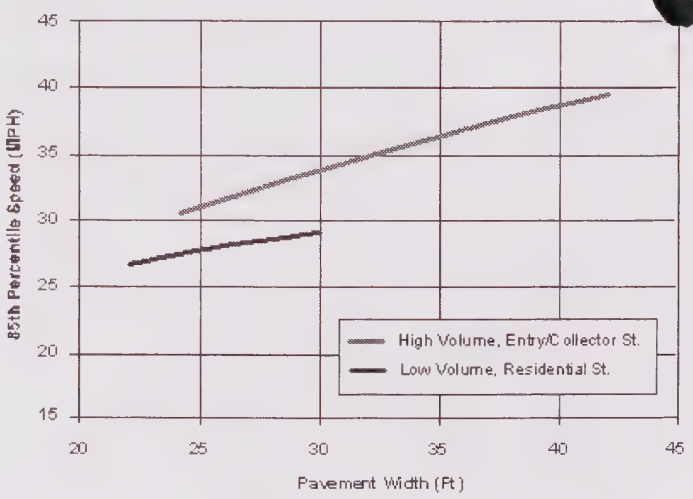
Block Length

The City of San Antonio, Texas, received many complaints regarding speeding in residential areas. Citizens perceived speeding on residential streets as a quality of life issue. Efforts ensued to implement traffic calming measures on existing streets. As part of this effort, data was collected to establish a relationship between travel speeds, unimpeded block length and street width. Unimpeded block length is the distance drivers may travel on a particular street segment without being required to slow or stop.

The study found that streets exceeding 600-800 feet in unimpeded block length were found to have an 85th percentile speed exceeding the speed limit (30 miles per hour on San Antonio residential streets). As a result of these findings, new street standards were developed that limited the unimpeded street length to 900 feet when traffic volume exceeds 500 vehicles per day (and further limits the unimpeded street length to 700 feet in cases). With regard to street width, the data collected in San Antonio also observed that travel speeds increased with wider streets.

Correlation Between Width, Unimpeded Block Length and Speed





Stockton's current street standards allow 1200-1,300-foot block lengths in new subdivisions.

Pedestrian Amenities

Pedestrian travel can be facilitated though the creation of shorter blocks, enhanced crossings and increased connectivity within neighborhoods. Pedestrian safety can be enhanced though reduced travel speeds and improvements to intersections and crossings. The City of Stockton is concurrently developing *Pedestrian Safety and Crosswalk Installation Guidelines* to address standards for the placement and design of pedestrian crossings. For the purposes of the *Street Design Guidelines*, the inclusion of shorter street widths, detached sidewalks and landscape strips will serve to enhance pedestrian travel. Additional design elements that would not be required but should be considered on a case-by-case basis to benefit pedestrians include bulbouts and street furniture.



Design elements such as detached sidewalks and landscape strips can benefit pedestrians.

Bicycle Facilities

Given the size and topography of Stockton, bicycling as a form of transportation may be an attractive option. In urban areas, bicycle travel is typically facilitated through the installation of bicycle lanes (Class II bikeways according to Caltrans standards) on City streets.

Another type of bicycle facility is the separated bicycle path (Class I bikeway), which can also accommodate pedestrian travel. These facilities are usually 10-12 feet wide (minimum of 8 feet) and commonly utilize utility or railroad rights-of-way. American Association of State Highway and Transportation Officials (AASHTO) guidelines recommend that sidewalk bicycle paths be limited to high-speed or heavily traveled roadways having inadequate space for bicyclists and uninterrupted by driveways and intersections for long distances. Caltrans standards for placement of a "Class I" bicycle path along a roadway require a raised barrier or at least five feet of separation between the path and roadway.

The *Street Design Guidelines* require wider sidewalks to accommodate bicycle travel along new arterial and collector streets. Special concerns may arise on streets with frequent intersections or driveways, or high volumes of pedestrians. Special design treatments would be recommended at intersections because motorists are often not accustomed to bicyclists traveling through crosswalks and bicyclists are often less visible to motorists when traveling on an off-street path. Bicycle lanes may be required on arterial roadways in lieu of sidewalk bicycle paths at the discretion of the Public Works Director.



Alternative Types of Intersection Control



Roundabouts are a unique traffic control device that may be useful in a variety of situations. They are often used in lieu of all-way stop control or traffic signals as a means of increasing the capacity of the intersection and improving its safety and operations. Roundabouts have complex design features that will vary from location to location. A generic design standard is included in this document. However, roundabouts should generally have the following characteristics:

- A circular travel lane operating counter-clockwise for collecting and distributing traffic
- A raised center island
- Flared and channelized approaches with splitter islands
- Yield control at all approaches
- Tapered approaches to encourage entering vehicles to travel in the correct direction through the circular travel lane

In general, roundabouts in the United States tend to be used on collector streets and on low-volume minor arterial streets. The use of roundabouts is primarily constrained by traffic volumes and by geometrics. The design of every roundabout should be customized using traffic and geometric information and procedures beyond what is presented in this report. The following examples illustrate cases where a roundabout may be appropriate:

- ***History of Accidents*** – Roundabouts are often placed at intersections with a history of accidents, especially head-on collisions and right-angle collisions. A roundabout can help improve safety by substantially reducing the number of conflict points and by simplifying interactions between vehicles

- ***Minimizing Queues*** – Another possible application is a collector/arterial intersection located near an arterial/arterial intersection. A roundabout may be useful here because it can allocate right-of-way between both the arterial and the collector, while minimizing the queues on the approach stemming from the arterial/arterial intersection

- ***Handling Irregular Approach Geometry*** – An intersection with greater than four approaches or with approaches that meet the intersection at irregular angles may be a candidate for a roundabout

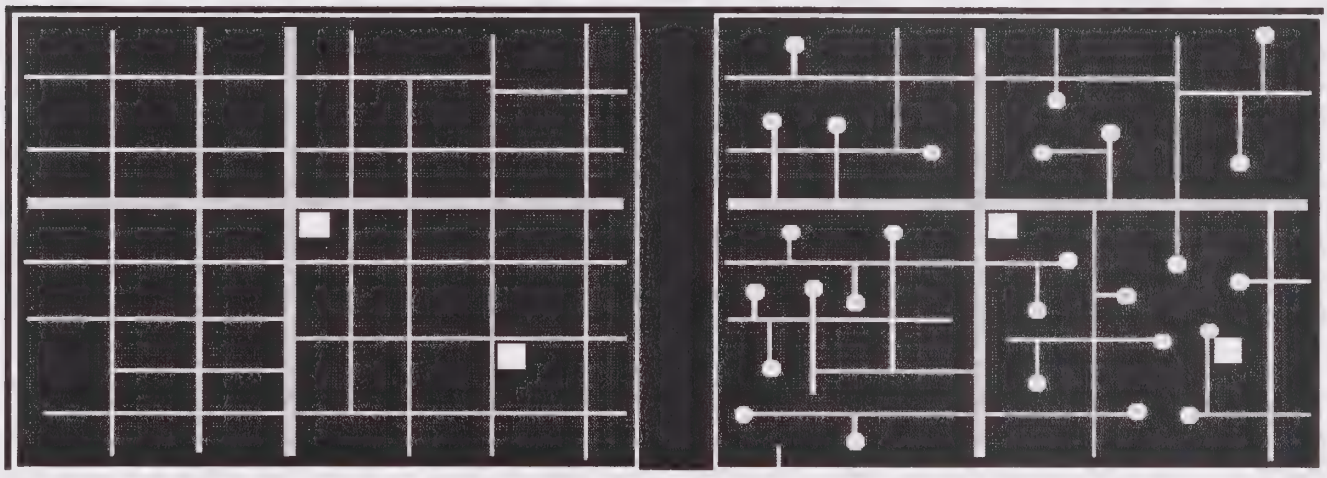
- ***Inexpensive Traffic Control*** – In some cases, traffic volumes at an intersection may be too high to allow acceptable operations with all-way stop control and a traffic signal might be considered inappropriate due to sight distance or other constraints. If ample right-of-way is already available, a roundabout may be considered

- ***High Proportion of U-Turns*** – If an intersection is situated where U-turns are frequent, a roundabout can facilitate those U-turns without adversely affecting the operations of the intersection as a whole

- ***Pedestrian Accommodation*** – Roundabouts represent a trade-off for pedestrians. They can be inconvenient for pedestrians because the crosswalks are set back farther from the intersection. They may also present difficulties for visually impaired pedestrians. However, crossing distances are shorter (fewer lanes) and are broken by pedestrian refuge islands, and pedestrians do not need to wait for a long traffic signal cycle. Pedestrian crash rates are lower in roundabouts than at signalized intersections

Connectivity

The design of new neighborhoods across the nation since the 1950s has typically included street networks that contain wider streets than older neighborhoods and a prevalence of dead-end "cul-de-sacs" to discourage cut-through traffic. This pattern of street development limits overall connectivity and emergency access, and often results in traffic congestion on arterial, collector and some local streets, as traffic is limited to a few through routes. During the past 15 years, some cities have considered adopting street standards that encourage a return to the traditional grid pattern of street design, which includes narrower streets, multiple access routes to disperse traffic, greater street connectivity and an enhanced pedestrian environment. Reducing block lengths for new local and collector streets is a means of increasing street connectivity in Stockton.



A grid pattern of streets (as shown on the left) disperses traffic across multiple streets and provides multiple emergency response routes.

What Are Other Cities Doing?

Many cities have revised their street design standards in recent years to include many of the design concepts discussed on the preceding pages.

Sacramento

The City of Sacramento updated it streets design standards in 1998. The update was in response to a consistent message from residents that previous standards did not result in livable neighborhoods, protests from the development community that the previous standards were too rigid, and City staff's desire to improve the clarity of the design standards.

Many neighborhood groups had complained that residential traffic volumes and speeds had contributed to a decline in quality-of-life. In response, the City initiated an aggressive program of traffic calming to reduce travel speeds on existing streets with identified problems. However, the City recognized that this program required substantial resources and could only address the existing street system.

The development of new street standards arose from a desire to improve the design of streets at the outset. Additionally, it was felt by many that the "best" streets in Sacramento included elements such as detached sidewalks and landscaped medians that were no longer allowed in the standards.

In developing the new standards, City staff adopted certain guidelines for the development of the new street standards, with regard to right-of-way width, width of parking spaces, sidewalk design, Fire Code requirements and tree planter specifications. Some trade-offs were necessary; for example, may residents and developers wanted narrower streets while the fire department wanted wider streets. Residents wanted vertical curbs while developers wanted rolled curbs. Others advocated for wider landscaped strips and bicycle lanes, while developers desired to limit the width of the overall right-of-way.

Following the development of draft standards and a public participation process, the City of Sacramento developed new standards that included:

- The minimum width of local residential streets was reduced from 36 feet to 30 feet
- Flexibility in the design of new streets was introduced by providing options. For example, sidewalk and planter strips were designated as minimums and can be increased at the request of the developer
- For collector streets, landscaped medians are required if the projected traffic volume exceeds a specific threshold
- Parking will be included based on the adjacent land use and requires an additional 7 feet per direction
- Bicycle lanes are required on arterial streets
- Planter strips are required on all streets, with minimum widths designated that can be increased by the developer
- Traffic calming devices such as bulbouts or traffic circles are encouraged to enhance the pedestrian environment

Eugene, Oregon

The City of Eugene adopted a Local Street Plan in 1996 that responded to desires for narrower streets, shorter blocks, greater street connectivity and a desire for the reintroduction of elements such as planter strips, detached sidewalks and alleys, commonly found in older neighborhoods, into new subdivisions.

The new street standards included a reduction in the maximum block length for a residential street from 1,200 feet to 600 feet. The new standard was based on the existing grid pattern found in Eugene's older neighborhoods, which contained blocks measuring 400 feet by 600 feet.

Other key elements of the new standards for local streets included:

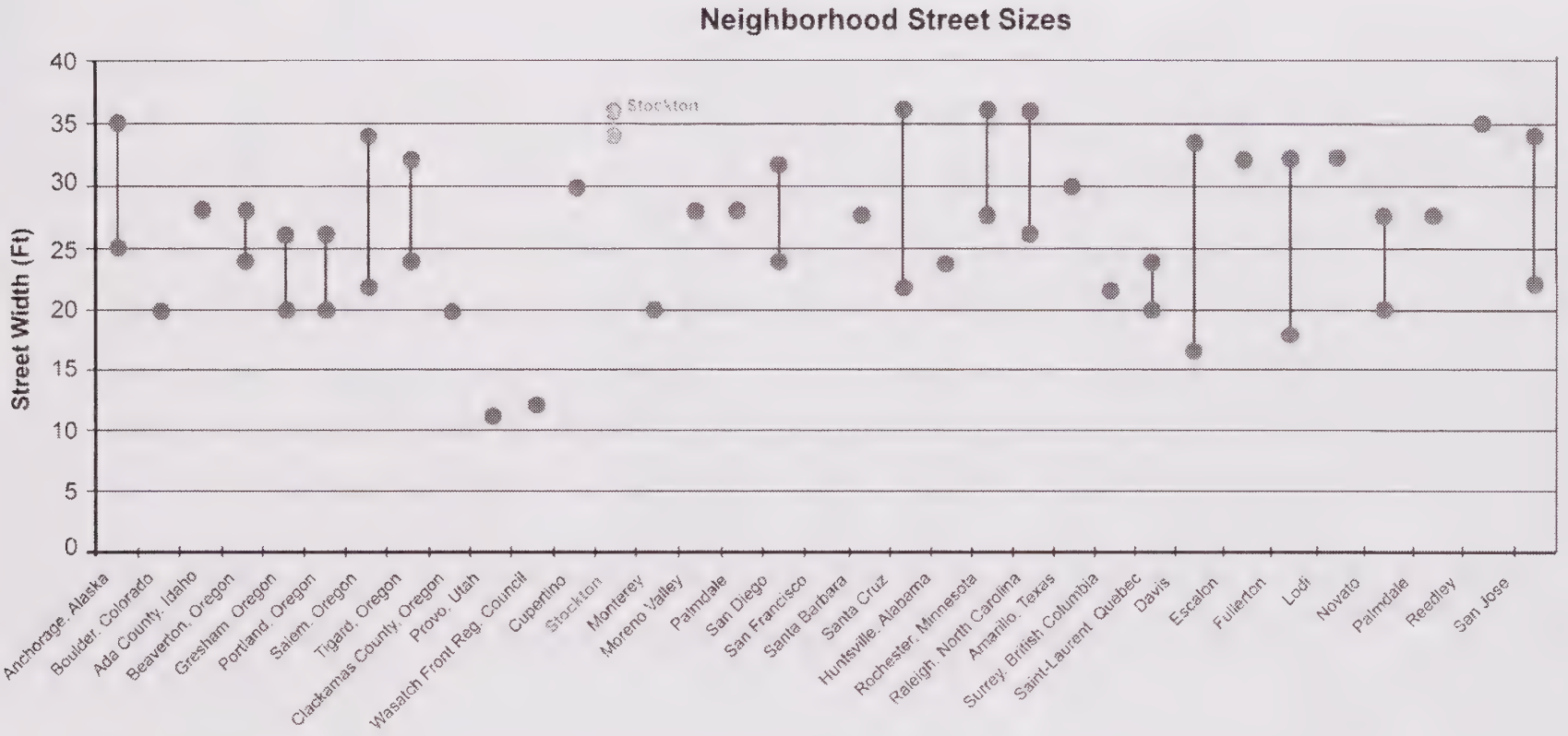
- A range of local street classifications, based on expected traffic volume, that included minimum widths varying from 21 feet for an "access lane", carrying less than 250 average daily traffic (ADT), to 34 feet for a medium-volume residential street carrying up to 750 ADT. Residential alleys were permitted with a width of 12 feet for one-way traffic or 16 feet for two-way traffic

- Local commercial and industrial streets would have a width of 30 to 44 feet

- Street connectivity was required and cul-de-sacs were discouraged unless necessitated by topographic or other physical barriers; if cul-de-sacs were necessary, then bicycle and pedestrian connections were required, wherever possible, to connect the ends of cul-de-sacs

Other Cities

As shown on the following page, Stockton's residential street width requirements exceed that of many other cities.



Source: Neighborhood Traffic Management Survey, Ransford S. McCourt, 1996 ITE District 6, Compendium of Technical Papers. City of Stockton.

IV. PROPOSED STREET STANDARDS

The proposed street standard revisions are summarized on the following pages. Key changes are indicated below.

Local Streets

Key revisions to the local street standards are:

- The minimum width of local residential streets would be reduced to 30-32 feet depending on the expected traffic volume. Current standards require 34-36 feet
- Landscape strips, separating the curb from the sidewalk, would be required on local residential streets
- Maximum block length would be reduced from 1,200 feet to 600 feet for low-volume residential streets and from 1,300 feet to 800 feet for medium-volume residential streets
- Rolled curbs would no longer be permitted
- Traffic circles would be required at intersections of two local streets where the ultimate combined volume will exceed 1,000 vehicles daily or the unimpeded distance on any of the approaches not subject to stop control exceeds 600 feet. The Public Works Director would have discretion to waive this requirement on a case-by-case basis

Collector Streets

Key revisions to the collector street standards are:

- Landscape strips, separating the curb from the sidewalk, would be required on most new streets
- Maximum block length would be reduced from 1,300 feet to 1,000 feet for collector streets
- Bicycle travel could be accommodated on sidewalks along new collector streets

- Bulbouts would be encouraged at intersections to reduce the crossing distance for pedestrians and discourage speeding through intersections

- Traffic circles would be required where a residential collector intersects a local street and the ultimate combined volume will exceed 1,000 vehicles daily or the unimpeded distance on any of the approaches not subject to stop control exceeds 600 feet. The Public Works Director would have discretion to waive this requirement on a case-by-case basis

- A roundabout would be required where two collector streets intersect and the ultimate combined entering traffic volumes will exceed 2,000 vehicles daily. A traffic signal may be required in lieu of a roundabout at the discretion of the Public Works Director

Arterial Streets

Key revisions to the arterial street standards are:

- Bulbouts would be allowed at some intersections to reduce the crossing distance for pedestrians and discourage speeding through intersections

- Bicycle travel could be accommodated on sidewalks along new arterial streets

Table 2: Proposed Street Standards

Item	Local				Collector		Minor Arterial	Major Arterial
	Low Volume Residential	Medium Volume Residential	Commercial	Industrial	Residential (Back-Up)*	Non-Residential		
Average Daily Traffic (ADT)	0 - 750	750 - 1,500	< 5,000	< 5,000	1,500 - 5,000	< 13,000	< 25,000	
Street Characteristics								
Number of Travel Lanes	2	2	2	2	2	2	4	6-8
Width (curb-to-curb) (feet)	30	32	34	40	26	48	66	90-112
On-Street Parking Allowed?	Yes	Yes	Yes	Yes	No	Yes	No	No
Parking Lane Width (feet)	7	7	7	8	None	8	None	None
Travel Lane Width (feet)	8	9	10	12	13	11	11-14	11-15
Left-Turn Lane Width (feet)	None	None	None	None	None	10	10-12	10-12
Raised Median (feet)	None	None	None	None	None	None	14	14
Block length (feet)	600	800	800	800	1,000	1,000	1,300	1,300
Sidewalk width (feet)	4	4	4 (detached) / 4.5 (attached)		8 (min.)	8 (min.)	8 (min.)	8 (min.)
Sidewalk Bike Path?	No	No	No	No	Yes	Yes	Yes**	Yes**
Detached Sidewalk Required?	Yes	Yes	Optional	Optional	Yes	Yes	Yes	Yes
Landscape Strip Width (feet)	6	6	6 / 5.5***		15 (including sidewalk)			

* Residences do not face collector or have driveways on collector.
** Bicycle lanes may be required in lieu of sidewalk bicycle paths at the discretion of the Public Works Director.
***6 ft. (detached sidewalk); 5.5 ft. (attached sidewalk).

Table 3: Comparison of Existing Versus Proposed Street Standards (Local Streets)

Street Type	Scenario	Curb-to-Curb Width (feet)	Planter Strip	Bike Lanes Required	On-Street Parking Allowed	Median	ROW (feet)
Local: Low-Volume Residential [5]	Existing	34 / 36 [6]	No	No	Yes	No	50
	Proposed	*30*	*Yes (6 feet)*	*No*	*Yes*	*No*	*50*
Local: Medium-Volume Residential [7]	Existing	36	No	No	Yes	No	60
	Proposed	*32*	*Yes (6 feet)*	*No*	*Yes*	*No*	*52*
Local: Non-Residential [8]	Existing	40	No	No	Yes	No	64
	Proposed	*34 (Comm.) / 40 (Indust.)*	*Optional (6 feet)*	*No*	*Yes*	*No*	*54 (Comm.) /60 (Indust.)*

[5] Low-volume residential local streets would carry up to 750 vehicle trips per day.
6 Curb-to-curb width for existing street standards includes rolled curb. For new streets, measurement is from curb to curb. 34-foot width is permitted if average daily traffic (ADT) is 400 or less.
[7] Medium-volume residential local streets would carry up to 1,500 vehicle trips per day.
[8] Non-residential local streets would carry up to 5,000 vehicle trips per day.

Table 4: Comparison of Existing Versus Proposed Street Standards (Collector Streets)

Street Type	Scenario	Curb-to-Curb Width (feet)	Planter Strip	Bike Lanes Required	On-Street Parking Allowed	Median	ROW (feet)
Collector: Residential	Existing	40-64	Optional (4 feet)	No	No	No	60-84
	Proposed	*26*	*Yes (15 feet including 8 foot minimum sidewalk)*	*No*	*No*	*No*	*56*
Collector: Non-Residential	Existing	40-64	Optional (4 feet)	No	Yes	No	60-84
	Proposed	*48*	*Yes (15 feet including 8 foot minimum sidewalk)*	*No*	*Yes*	*Yes*	*78*

Table 5: Comparison of Existing Versus Proposed Street Standards (Arterial Streets)

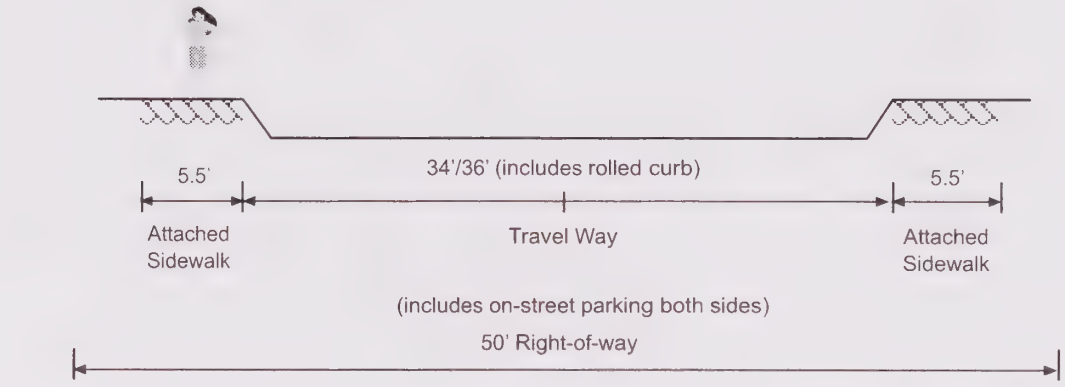
Street Type	Scenario	Curb-to-Curb Width (feet)[1]	Planter Strip	Bike Lanes Required	Parking	Median	ROW (feet)
Minor Arterial	Existing	64-90	No	No	No	No	84-110
	Proposed	*66*	*Yes (15 feet including 8 foot minimum sidewalk)*	*If included in Bicycle Plan*	*No*	*Yes*	*96*
Major Arterial	Existing	114	Yes (16 feet)	No	No	Yes	134
	Proposed	*90*	*Yes (15 feet including 8 foot minimum sidewalk)*	*If included in Bicycle Plan*	*No*	*Yes*	*120*

Cross Section Diagrams

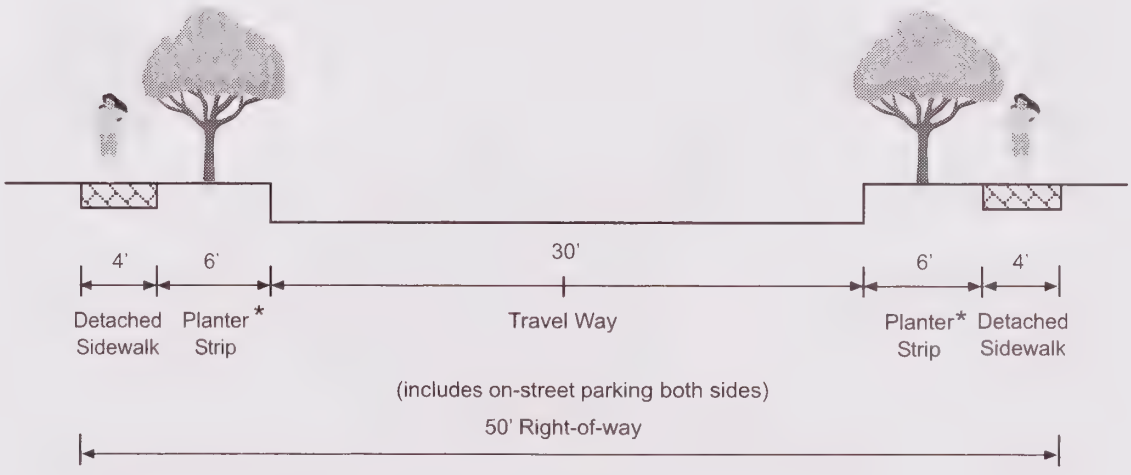
Figures A through H on the following pages contain cross sections portraying the required elements within each street classification under the proposed standards and a comparison with the elements and width requirements contained under the current standards.

LOCAL STREETS

Low Volume Residential



Existing



Proposed

* Width includes vertical curb.

City of Stockton

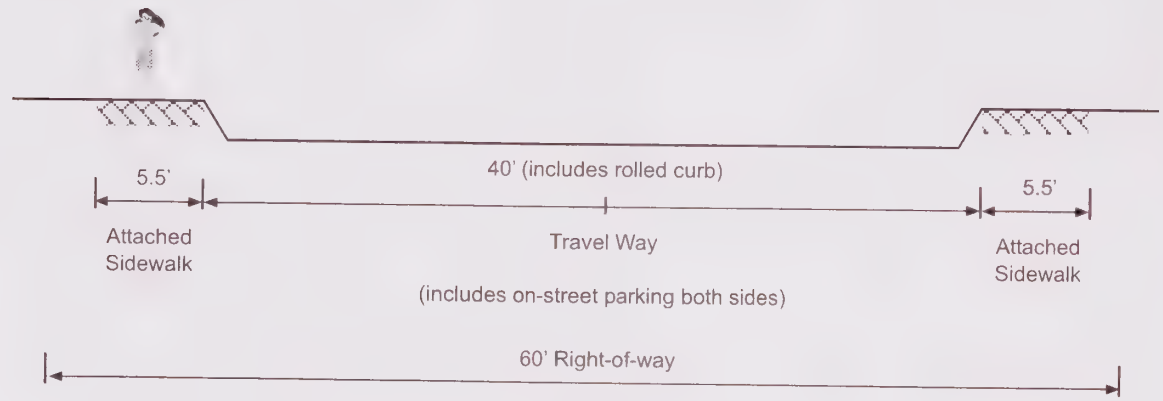
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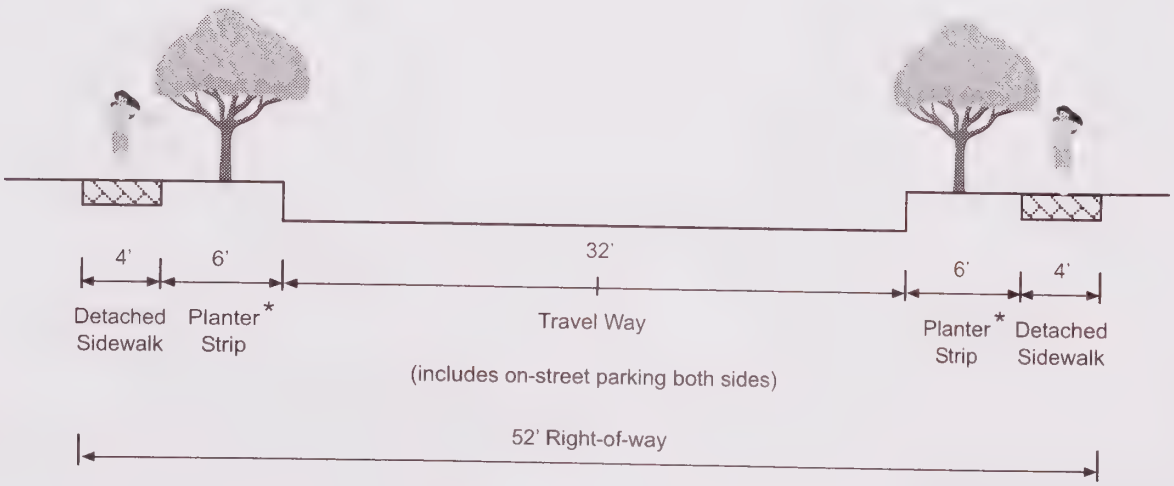
DRAFT STREET STANDARDS
FIGURE A

LOCAL STREETS

Medium Volume Residential



Existing



Proposed

* Width includes vertical curb.

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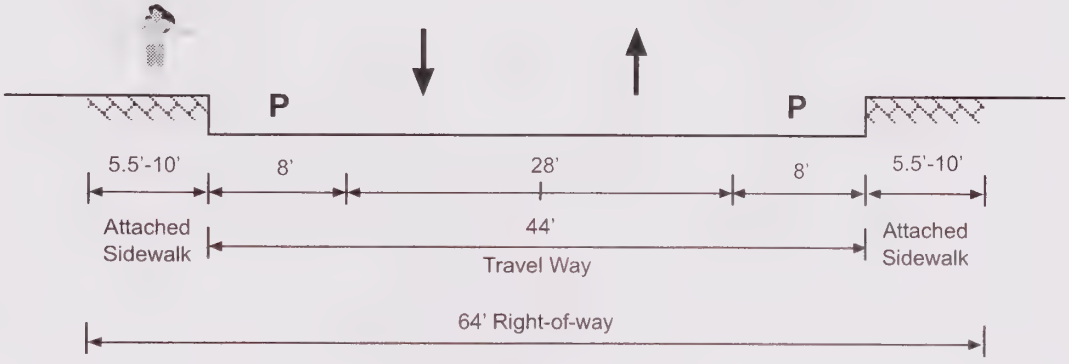
City of Stockton

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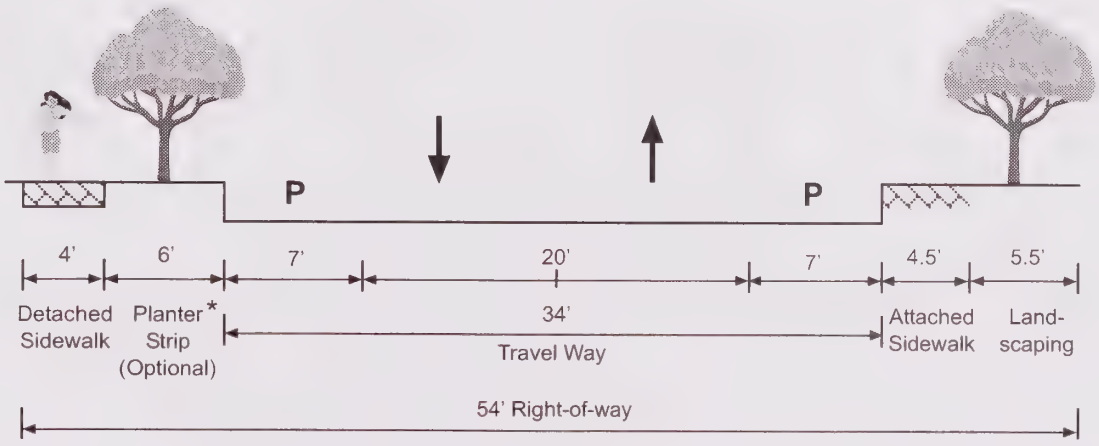
FIGURE B

LOCAL STREETS

Commercial



Existing



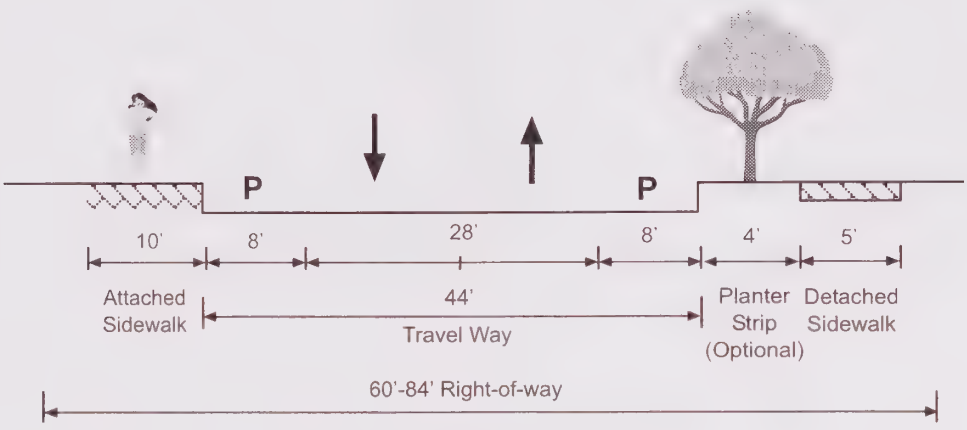
Proposed

* Width includes vertical curb.

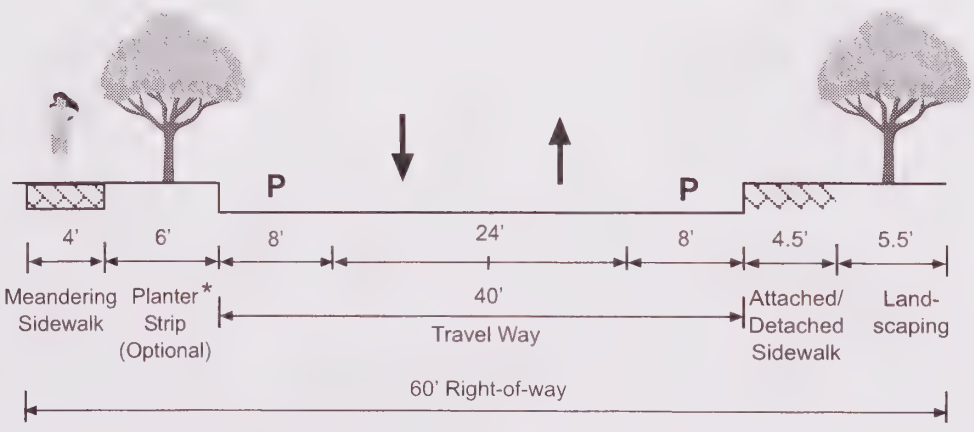
P = Parking

LOCAL STREETS

Industrial



Existing



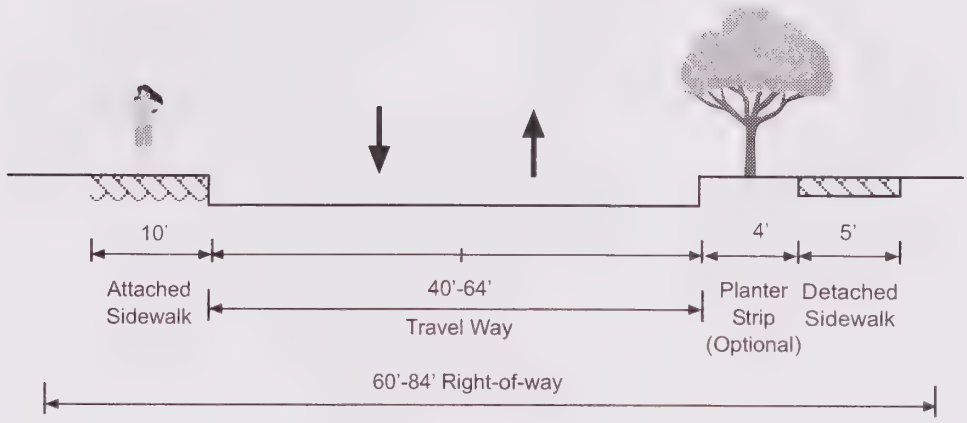
Proposed

* Width includes vertical curb.

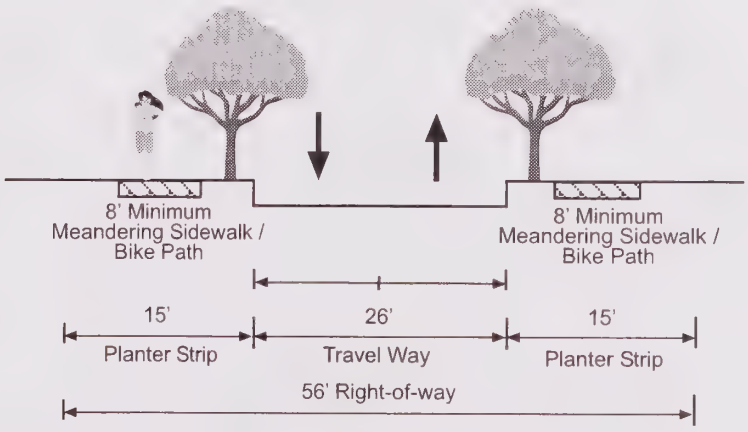
P = Parking

COLLECTOR STREETS

Back-up Residential



Existing



Proposed

* Width includes vertical curb.

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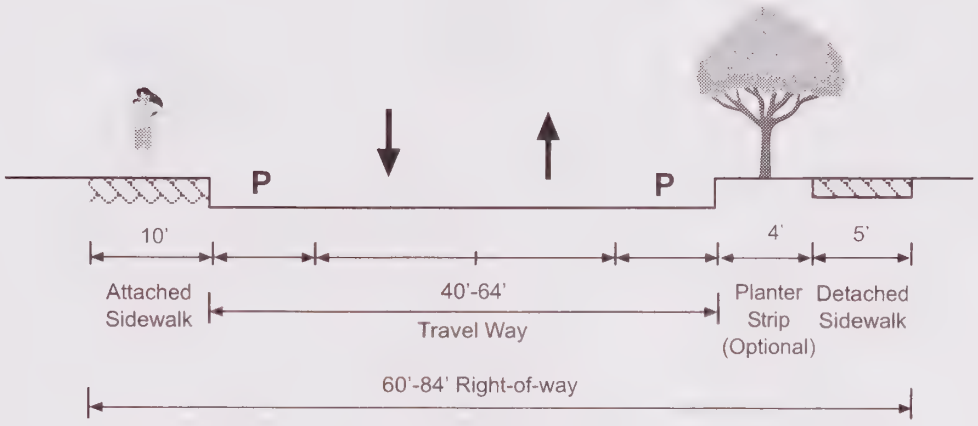
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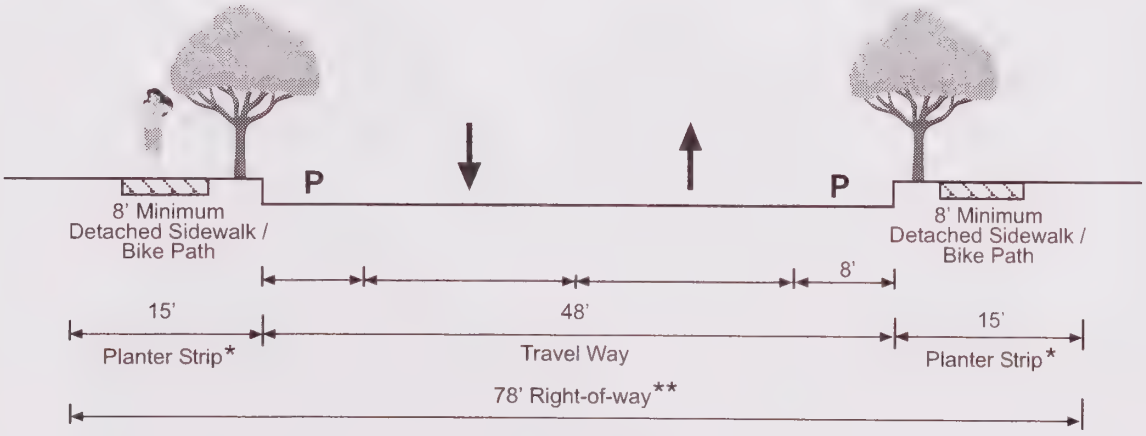
FIGURE E

COLLECTOR STREETS

Non-Residential



Existing



Proposed

* Width includes vertical curb.

** NOTE: Intersections to be flared for left-turn lanes

P = Parking

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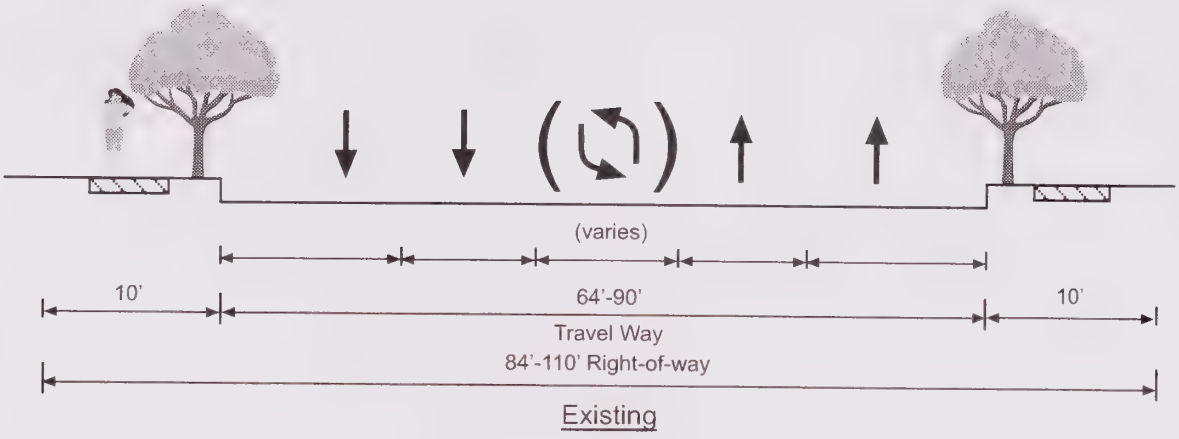
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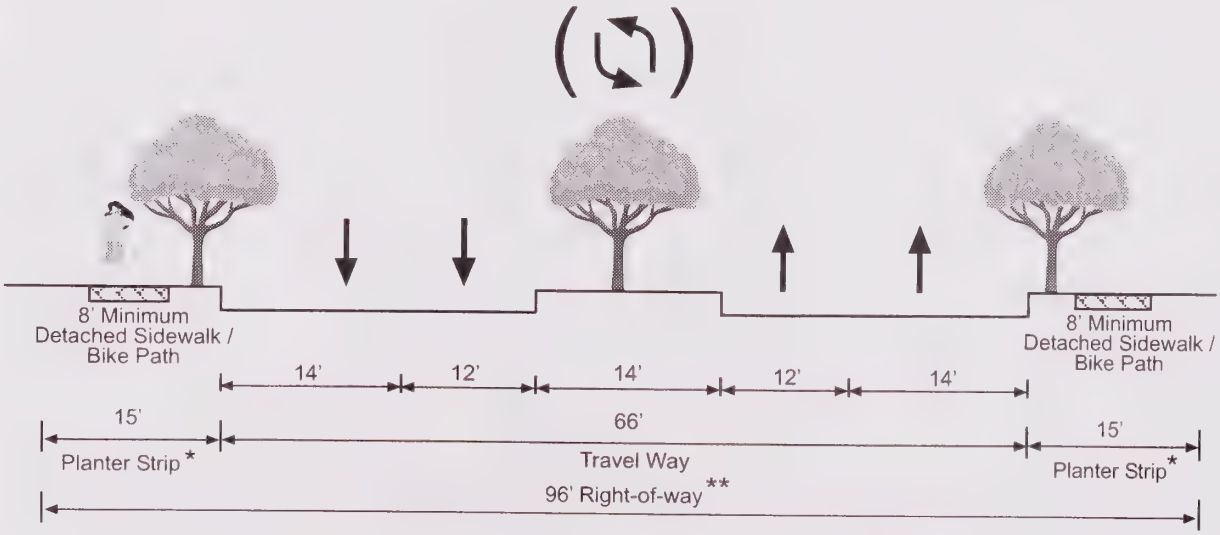
FIGURE F

ARTERIAL STREETS

Minor Arterial



Existing



Proposed

* Width includes curb.

** NOTE: Intersections to be flared to allow for left-turn and/or right-turn lanes.

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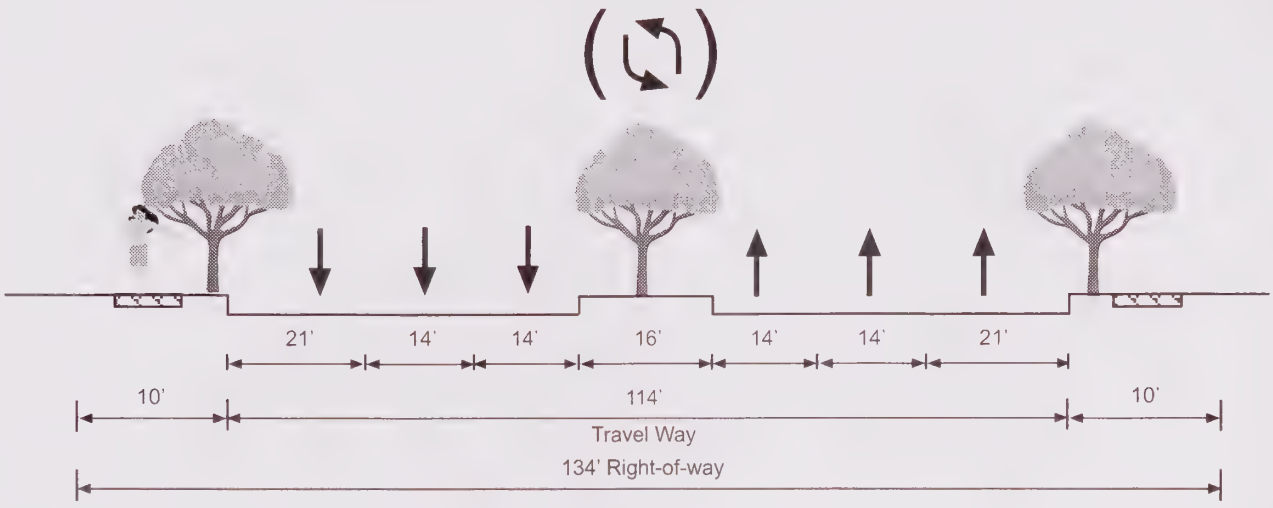
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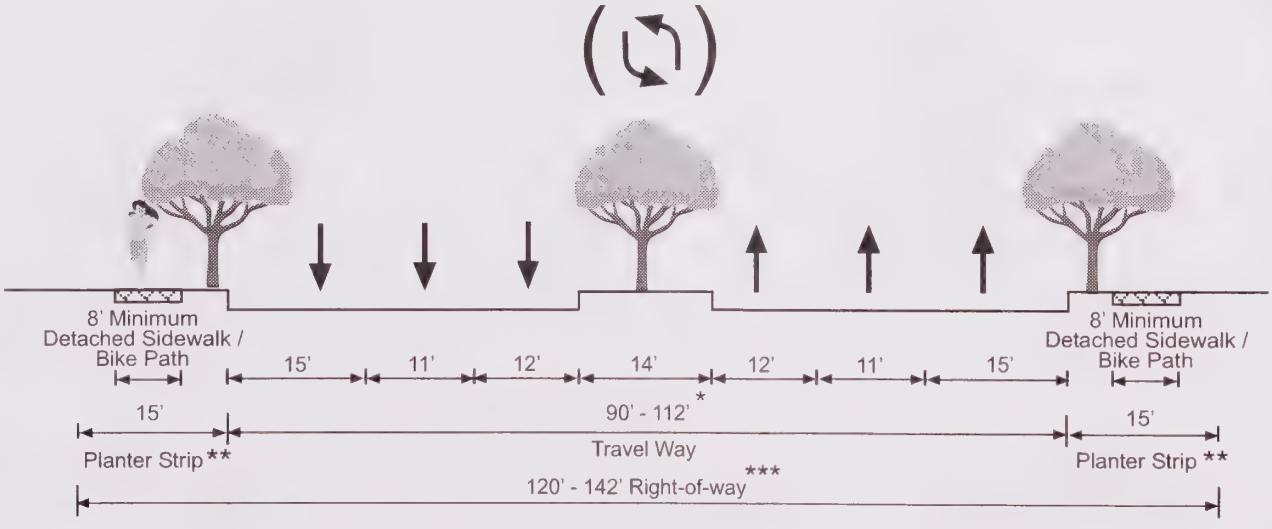
FIGURE G

ARTERIAL STREETS

Major Arterial



Existing



Proposed

* 112-foot travel way would apply if eight travel lanes are provided.

** Width includes curb.

*** NOTE: Intersections to be flared to allow for left-turn and/or right-turn lanes.

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FIGURE H

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